Table of Contents

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TURNOVER IN FOOD STAMP PARTICIPATION: A PRELIMINARY ANALYSIS

by

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Table of Contents

Table of Contents

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CONTENTS

Table of Contents

TABLES

TABLES (continued)

Table of Contents

FIGURES

EXECUTIVE SUMMARY

A. OVERVIEW

Although a substantial amount of research has been performed on the subject of the extent of participation in the Food Stamp Program, and the socioeconomic characteristics of households that are correlated with participation in the program, relatively little research has been performed on patterns of entry into, and exiting from, the program over time, phenomena that we refer to generically as "turnover." Furthermore, such research on turnover as has been performed has been quite limited in nature, generally using data that are not representative of the U.S. population.

This report presents the results of an analysis of food stamp turnover in 1979, based on data from the 1979 Income Survey Development Program (ISDP) research panel, a unique national probability sample of about 7,500 U.S. households. This survey provides data on the receipt of food stamp benefits on a month-by-month basis, and it also permits researchers to simulate whether or not each household in the sample is eligible to participate in the Food Stamp Program. Furthermore, many other socioeconomic characteristics of households were ascertained on either a monthly or quarterly basis, and changes in household composition, including household formation and dissolution, could be identified. These factors have made possible a comprehensive analysis.

The principal questions we have attempted to answer are as follows:

- How can the turnover pattern in the Food Stamp Program be characterized in general? What proportion of participants have long spells versus (frequent) short spells, etc.?

- How many households participate each year, as opposed to each month?

- Are recipients who have been receiving food stamps for a long time less likely to leave the program? What part of participation is "permanent"?

- Are some types of households significantly different from others with respect to probabilities of entering and leaving the Food Stamp Program? To what extent do such differences reflect variation in eligibility as well as participation decisions?

Briefly, the answers to these questions, as they pertain to the year 1979, are as follows:

- There is substantial turnover in terms of both participation and eligibility. Only about one-third of participants observed in the 1979 ISDP Panel received food stamps for the entire 12-month period.

- The number of households that participate in the program at least one month out of the year is over 1.7 times the number of households tha participate in the program in a typical month.

- Households that have been receiving food stamps for a long time appear to be less likely to leave the program, although statistical problems complicate the interpretation of this apparent pattern.

- There are substantial and systematic variations in rates of entry into, and exit from, participation in the program. These patterns are highly correlated with patterns of turnover in eligibility.

B. METHODOLOGY

Our analysis was carried out in two phases. First, we performed a largely descriptive, cross-tabular analysis in order to provide an overview of the general level of turnover in food stamp participation and eligibility during 1979, as well as the manner in which turnover varied over the course of the year, and the manner in which turnover varied across socio-economic groups of particular interest to FNS.

Several indicators of turnover levels were used. The most important of these were the entry rate (i.e., the proportion of all households who did not receive food stamps in one month who were receiving food stamps in the next month) and the exit rate (defined analogously). Other measures of turnover that were used include the proportion of households that continuously received food stamps, the number of spells of food stamp participation during the sample period, and the average duration of food stamp participation.

The second phase of this analysis entailed estimation of a multivariate statistical model of participation and eligibility spells and changes. Using the RATE model, the probabilities of entering and exiting from the Food Stamp Program (or to and from eligibility for the program) were estimated by means of maximum likelihood as functions of household characteristics hypothesized to affect (or to proxy for other factors affecting) eligibility and participation.

C. EMPIRICAL FINDINGS

1. Participation

In the tabular analysis, it was found that there were significant levels of movement of households into and out of the program; the number of households who benefit from the program over the course of a year is over 70 percent greater than the number who benefit in any given month. Furthermore, there are significant variations in observed turnover across socioeconomic groups of interest. Specific findings of interest include the following:

- Of all households who received food stamps in a given month, 7.3 pecent had exited from the program within the next month.

- Given that a household did not receive food stamps in a given month, there was an 0.53 percent probability that it entered the program in the next month.

- Of the households that were present in the sample for the full calendar year and reported receiving food stamps at any time, about one-third received food stamps for the entire year.

- The probability that a household was a food stamp recipient household at least once in the course of the year was 1.74 times the probability that it participated in the program in a given month.

- There are systematic variations in entry and exit rates across households. Among socioeconomic groups of interest, the lowest monthly exit probabilities were exhibited by households that received AFDC and/or other types of welfare, nonwhite households, households containing an elderly or disabled person, households in which no person is employed, households whose head has relatively little formal education, and households headed by a single person.

- The highest probabilities of entrance into the program were exhibited by households that received AFDC, households headed by a single person with children, nonwhite households, large households, households in which no person is currently employed, households whose head has had little formal education, and households in which an elderly or disabled person is present.

The multivariate results tend to support those indicated by the tabular analysis. In particular:

- Entry rates are higher, and exit rates lower, for nonwhite households (controlling for other explanatory variables).

- Households with no earner present have higher entrance rates and lower exit rates.

- Households headed by single persons, and households with elderly or disabled members tend to stay on the program longer than other households.

- AFDC recipients are more likely to enter the Food Stamp Program, and less likely to leave, than otherwise similar households.

2. Eligibility

A household's eligibility or ineligibility to receive Food Stamps is an indication of the level of economic resources available to it, as eligibility is based on certain income and asset criteria. Accordingly, if the rate of entry into eligibility (i.e., the probability that a previously ineligible household becomes eligible) is relatively high, then that indicates that the household's economic security is relatively precarious. Also, if the rate of exit from eligibility is relatively high, then that indicates that the economic problems that caused the household to become eligible for the program in the first place are somewhat transitory. For these reasons, the analysis of turnover in eligibility is of interest.

The principal findings of the tabular analysis are as follows:

- There appears to be substantial turnover in food stamp eligibility. In our sample, the probability that an eligible household became ineligible each month was about 17 percent, and the probability that a previously ineligible household became eligible was 6.3 percent. Both of these probabilities are substantially higher than the corresponding probabilities in the analysis of patterns in participation.

- The types of households that have the highest propensity to become eligible for Food Stamps are those that receive AFDC and other types of welfare, households headed by a single person with children, nonwhite households, households whose head has had relatively little formal education, households in which no person is working, and households containing elderly or disabled persons.

- The types of households that have the lowest propensity to leave eligible status are those that receive AFDC and other types of welfare, households with a head who is over the age of 65, households with a single head, one-person households, households in which no one is employed, and households containing a disabled person.

Most of the predicted relationships between characteristics and eligibility transitions indicated in the tables are maintained when other factors are held constant in the multivariate analysis. In particular:

- Households with elderly or disabled members, those with AFDC, and nonwhite households are all more likely to become eligible for the Food Stamp Program than otherwise-similar households.

- Single-headed households with children are more likely to become eligible than are other households.

- Households with elderly or disabled members, nonwhite households, single-headed households, non-earners and AFDC recipients are all more likely to remain eligible for food stamps.

I. INTRODUCTION

A. OVERVIEW

This report presents an analysis of turnover in the Food Stamp Program during 1979. Turnover, as considered here, describes movements of households in and out of the Food Stamp Program, including underlying transitions in eligibility for food stamps. This research is based on data from a unique data source, the Income Survey Development Program (ISDP) 1979 Research Panel, which has not previously been exploited for this purpose.[1] This paper presents both descriptive tabular analysis and multivariate econometric models focusing on patterns of food stamp participation and eligibility over time and across a set of socioeconomic and demographic characteristics with which these transitions are expected to be associated.

Information on turnover in food stamp participation--instances of entry into and exits from the program--is needed for understanding important policy issues. The Food Stamp Program uses a monthly accounting period--eligibility is based on income in a single month. Participation statistics have, in general, been organized on a monthly basis as well, with little emphasis on duration of participation or the rate at which households enter and leave the program. For a variety of policy purposes, information on turnover is necessary. For example, proposals to enforce a time limit on food stamp receipt have been made in the past. Without data

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[1]This paper is an extension of a preliminary analysis based on a 6-month subsample of these data (Carr and Manser, 1982). In addition, Czajka (1981) and MacDonald (1981) have performed related analyses of food stamp participation using the ISDP data.

on actual participation duration, the effects of such proposals are difficult to predict. Certain kinds of households are treated somewhat differently in the Food Stamp Program--for example, households with elderly or disabled members have different income and deduction rules; recipients of other welfare formerly were automatically eligible for food stamps. Rates of entry and exit into and out of the program--turnover--are an important dimension to understanding how groups of participants differ and assessing the desirability of different treatment for some groups. However, at present relatively little is known relating to issues such as:

- How can the turnover pattern in the Food Stamp program be characterized in general? What proportion of participants have long spells versus (frequent) short spells, etc?
- How many households participate each year, as opposed to each month? While analysis of turnover patterns per se is not necessary to accomplish this objective, it is necessary in order to provide the information to forecast the annual caseload if only monthly data are available.
- Are some types of households significantly different from others with respect to probabilities of entering and leaving the Food Stamp Program? To what extent do such differences reflect variation in eligibility probabilities as well as participation decisions?
- Are recipients who have been receiving food stamps for a long time less likely to leave the program? What part of participation is "permanent"?

Some questions, such as the last listed, cannot be completely answered. However, the present analysis provides a useful view of turnover in the Food Stamp Program and a variety of information relating to question such as those posed above. This analysis takes advantage of the particularly relevant analytic content of the ISDP panel--data on food stamp participation by month, other transfer program participation, detailed

income sources and amounts, as well as expenses and other items necessary to measure food stamp eligibility. The tabular and econometric analysis of participation and eligibility transitions are designed to complement each other, with the tables identifying important patterns and trends and the multivariate analysis extending these results to identify separate quantifiable effects.

B. PREVIOUS RESEARCH

Researchers and policymakers have long had an interest in investigating the factors that determine whether or not an individual or a household receives benefits from various income maintenance programs. In addition to research on what may be termed the static aspects of participation in these programs, a relatively small but growing body of research has developed that focuses on the longitudinal aspects of program participation; that is, the movements of individuals and households into and out of these programs over time. We now briefly summarize the findings of several recent studies of the determinants of participation in both the Food Stamp program and similar programs such as the Aid to Families with Dependent Children (AFDC) program.

1. Cross-section studies

The first group of studies discussed may be characterized as cross-section analyses of participation behavior. Following (explicitly or implicitly) a general utility maximization model, household or individual participation decisions are hypothesized to depend on benefits, other income, and the direct and indirect costs of participation in welfare programs.

Maurice MacDonald (1977) used data from the 1972 wave of the Panel Study of Income Dynamics (PSID) to estimate a dummy variable regression equation predicting participation among eligible households (with eligibility simulated under 1971 program rules and based on 1971 annual income). MacDonald estimated the overall participation rate at 42 percent and found this probability to be significantly affected by expected annual food stamp benefit amount, as well as by participation in other welfare programs, household assets, labor force status and local labor market conditions.

Richard Coe (1982) used the Panel Study of Income Dynamics (PSID) in a cross-section study of participation in the Food Stamp Program in 1979, a period following major reforms in the program. The PSID for 1979 included observations of food stamp participation as well as information about why non-participants did not participate and in particular, the reasons why some households believed they were ineligible. Coe estimated a multiple choice linear probability model in which 10 alternative probabilities--the probability of participating plus probabilities of nonparticipation for nine inclusive and mutually-exclusive reasons--are defined as functions of a vector of demographic and program characteristics. His results indicate that participation probabilities are significantly related to family status, number of children, education, income, labor force status and participation in other welfare programs. Somewhat surprisingly, food stamp benefit amount had no significant effect, although it seems likely that an alternative bonus amount variable (a per-person amount, for example) might have yielded different results. In evaluating the alternative reasons given for non-participation, Coe attempts to allocate between-group differences in participation probabili-

ties according to reasons given for nonparticipation--he uses the participation equation to estimate participation rate differentials between types of households, and then uses the non-participation by reason equations to account for these differentials.

Coe estimated an overall participation rate of 46 percent across all eligible households, an increase from his earlier estimate (Coe, 1979) for 1976 of 41 percent. Underlying this still-low participation rate, he found substantial differences by household type. Among eligible non-participants the most significant reasons given for not participating was a belief that they were in fact not eligible for food stamps, although this also varied across households. Coe's interpretation of this finding is that information barriers are more significant than other program attributes (e.g., purchase requirements, benefit levels) in explaining participation behavior. Although given the problems in specifying program variables (particularly bonus amount), it is not clear that the impact of information barriers is as large as these estimates indicate, they seem to be important in explaining nonparticipation.

Myles Maxfield, Jr. (1979) estimates a model of AFDC and Food Stamp Program participation choices among eligible households, using a twelve-month control sample from the Seattle Income Maintenance Experiment and the Denver Income Maintenance Experiment (SIME/DIME) for 1972. Maxfield's approach used a stochastic utility function with income and leisure and arguments. The probability of participation is defined in terms of the utility comparison between participation and nonparticipation. Families are hypothesized to choose participation when the net utility of that choice (transfer payment less "stigma" and direct costs of participation)

exceeds the utility resulting from not participating. In this approach, the transfer payment utility is "not realized solely through the consumption of goods, but is also realized through consumption of nonmarket time" (p. 4). The welfare stigma variable cannot be observed directly and is conventionally approximated by a vector of observable demographic characteristics. Maxfield found that participation is related to the hypothesized variables and that consumption of nonmarket time is a significant determinant of participation probabilities. He concluded that the labor supply response to welfare programs should be considered in conjunction with direct payments in evaluating participation in these programs.

John Czajka (1981) undertook cross-section analysis of food stamp participation behavior similar in some respects to MacDonald's (1977) and Coe's (1982). Using the second wave (three reference months) of the 1979 ISDP Research Panel, Czajka was able to utilize information on income and food stamp participation specific to particular months, rather than annual measures used in other studies. Given the incidence of subannual periods of food stamp participation, the availability of monthly data is an advantage in estimating participation rates conditional on eligibility. Czajka estimated dummy variable OLS regression equations for each month, in which the probability of participation was specified to be a function of income (non-welfare income), expected food stamp benefit, assets, employment status, and a vector of demographic variables such as age, race, education, and number of children. In one set of estimates the independent variables include, in addition, participation in other welfare programs. the resultant estimates indicated that non-welfare income, assets, employ-

ment, food stamp benefit and participation in other welfare programs are all significantly related to participation rates. The effect of expected benefit was direct only for "moderately poor" households (Czajka, p. 69) while benefit increases for very low income households (with large expected benefits) had no effect and benefit increases for households near the income eligibility cutoff (with low expected benefits) were associated with decreases in participation rates. Czajka used a relative bonus amount--the ratio of expected benefit to the poverty line--which effectively accounts for the effect of household size and the economies of scale in the food stamp benefit determination. The aggregate estimates of participation rates from the Wave 2 ISDP data range from 28 to 37 percent, depending on which of the three months is used and whether the calculation includes seemingly-ineligible recipients. (Czajka's paper includes a very useful discussion of definitional issues that arise in estimating participation rates.)

2. Longitudinal studies

A second broadly defined area of research, most closely related to the work presented here, covers longitudinal analyses of participation in public assistance programs. This group of studies includes descriptive analyses and calculations of summary turnover measures as well as applications of multivariate econometric models to longitudinal data.

Ricardo C. Springs (1977) used monthly data from the Seattle Income Maintenance Experiment (SIME) in an accounting period approach to estimate intra-year changes in income. Because the Food Stamp Program and other welfare programs use accounting periods of less than a year, eligibility simulations that rely on annual income are subject to error. Springs'

analysis was oriented toward assessing the accuracy of such annual income-based eligibility simulations, estimating food stamp participation rates for eligible households, and estimating part-year participation and turnover rates. Springs found evidence of "considerable movement of eligible participating families in and out of [the Food Stamp] Program" (p. 45). He estimated participation rates at less than 50 percent among households eligible for food stamps in at least one month for 1971, and calculated a ratio of 1.36 between annual and monthly participation levels in Seattle in 1971.

Carolyn Merck (1980) conducted a tabular analysis of food stamp turnover using the control group for the Denver Income Maintenance Experiment (DIME). The control group (households eligible for but not receiving the income maintenance payments demonstrated) was observed from 1971 through 1974. Merck constructed measures of turnover and recidivism such as the ratio of annual to monthly participation[1] (like Springs') and the frequency of recurring spells of participation. Merck found turnover to be higher in the Food Stamp Program than in AFDC and to be higher for two parent families than for those headed by single persons. Recidivism (defined as multiple spells) was higher in the Food Stamp Program than in AFDC. This is a narrow definition of recidivism, however, and this result is a direct extension of the difference in average duration between the two programs and the fact that a finite sample period is observed. Merck restricted this analysis to intact households, thus obscuring transitions in program participation related to changes in household composition--a

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[1]The number of families participating at any time during a calendar year divided by the number participating in a given month.

particularly limiting approach given the length of time observed. Preliminary data file development with the ISDP panel reveals that even in a one-year analysis period, household composition changes are observed frequently.

Michael Boskin and Frederick Nold (1975) used longitudinal caseload survey data for Calfornia to estimate a Markov chain transition probability matrix. The transitions modeled were beginning or ending a spell of AFDC recipiency, and the explanatory variables used were race, expected unemployment and nonwage income. The wage and unemployment variables were not observed directly (the survey included little detailed income information) but were imputed based on equations estimated from the 1967 Survey of Economic Opportunity, using characteristics such as age, sex, race, education, location and union membership. Their logistic maximum likelihood estimates indicated that persons facing a sub-minimum wage, persons with an expected unemployment duration of more than two weeks, or nonwhites are less likely to leave welfare and more likely to begin welfare than otherwise. The data set employed by Boskin and Nold was for a "starting cohort"--households coming onto AFDC in 1965 were followed for five years. Although they found (p. 478) that "... an enormous amount of turnover occurs in the welfare population, and the average duration of time on welfare, once on, is relatively modest....", they also note (p. 473) that turnover estimated for this sample "... may be higher than if our data were for a random sample of all welfare recipients in a given month." Indeed, if the probability of leaving decreases with the length of a spell, that would necessarily be the case. Even without duration dependence, duration estimates will be biased downward if the members of the starting

cohort are heterogeneous with respect to expected duration (see, for example, Salant, 1977). One of the advantages of the 1979 ISDP panel for turnover analysis is that the sample need not be restricted to cohorts (although a starting cohort subsample can be constructed).

Robert Hutchens (1981) also focused on AFDC turnover, using a logit analysis approach and microdata from the Panel Study of Income Dynamics (PSID). The theoretical model used by Hutchens presents AFDC entrances and exits as "transition[s] between two net-income-leisure constraints" (p. 219). The utility-maximizing status will change when the expected utility from the alternative status (e.g., participation, if not now participating) exceeds that from the current status plus costs of making the transition. The model thus includes nonwage income, expected wage, AFDC payment levels and characteristics intended to serve as controls for deteminants of leisure preferences.

The PSID data permit only comparison of annually observed participation behavior--in Hutchens' paper, 1970 and 1971. Entry is defined as receiving AFDC in 1971 given non-receipt in 1970; conversely, exit from AFDC is defined as non-receipt in 1971 given receipt of AFDC in 1970. Since the evidence from survey data as well as other studies indicates the occurrence of sub-annual spells, the inability to observe intra-year participation transitions with the PSID is a limitation. This would be more serious in an analysis of food stamp turnover, since food stamp participation spells are expected to be shorter on average than AFDC spells.

Like Plotnick, whose work is discussed below, Hutchens did not analyze cases of remarriage and restricted his sample to households with

the same composition (or at least headship status) in 1970 and 1971. The logit estimates obtained indicated that benefit levels, earnings and unearned income have a significant effect on AFDC exit rates.

Robert Plotnick (1983) used a control group of families with female heads, from the Denver Income Maintenance Experiment (DIME) to estimate a model of turnover in the AFDC program. He used the Tuma event history analysis approach, in which the instantaneous rate of transition from one "state" to another (in this case, on or off the AFDC caseload) is estimated as a function of observed exogenous variables. Plotnick found that age, AFDC benefit amount, and expected hourly wage are significant determinants of AFDC turnover rates. A proxy variable for "left-censorship"--i.e., spells in progress when first observed--also had a significant effect, although as Plotnick pointed out, the alternative interpretations of duration dependence or sample heterogeneity cannot be distinguished. Plotnick's analysis is based on longitudinal observations of individuals, rather than household units. Household status changes, which as will be seen are critical in the proposed analysis of food stamp participation, were not dealt with in Plotnick's analysis. Indeed, he treats (re)marriages resulting in exits from AFDC as cases of sample attrition.

Mary Jo Bane and David Ellwood (1983) further examined the dynamic aspects of participation in the AFDC program, emphasizing the policy implications of AFDC turnover. They used the Panel Study of Income Dynamics for the years from 1968 to 1979. Because the PSID is an annual sample, the analysis excludes subannual transitions. Bane and Ellwood follow individual women who were ever single heads of families--although they exclude some women who may have received AFDC while part of another

household, this approach is less limiting than the restriction to intact families seen in other studies.

In addition to constructing summary measures of AFDC turnover and a descriptive tabular analysis, Bane and Ellwood used a multinomial logit approach to predict exit probabilities by type ("reason") and by year, as functions of characteristics of the individuals (race, education), regional economic and program variables, and finally duration of participation. They found that race, education, number of children and earnings history are all significant predictors of AFDC exit rates and duration of participation spells.

To summarize, a large and growing body of research on the topics of participation in welfare programs and patterns of participation over time has appeared in recent years. However, there have been relatively few studies of the longitudinal patterns of participation, because of exacting data requirements. As noted in the discussion above, most of the earlier studies are subject to particular data limitations, many of which can be overcome with the ISDP longitudinal file.

Much of the interesting work on determinants of participation rates has been in a cross-section analysis framework (e.g., MacDonald, Coe, Czajka). While these studies have done much to enlighten and validate models of participation behavior, they cannot provide any information about changes in participation over time.[1] Among the longitudinal analyses, data limitations of various kinds limit the extension of results to evaluations

[1]However, their findings do have definite implications for longitudinal patterns. If households in group A have a higher participation rate than households in group B in the cross section, it must be because group A has a higher entry rate, a lower exit rate, or both.

of national programs. For example, the SIME/DIME control group data used by Springs, Merck, Plotnick and Maxfield include only low-income (potentially welfare-eligible but not participating in the negative income tax experiment being conducted) households in Seattle and Denver. Other longitudinal data, such as the PSID used by Hutchens, Bane and Ellwood, and Coe include only annual measures of income and program participation. Because eligibility status and participation can change on a subannual basis, resulting in spells of need and of participation of less than a year, these data do not provide a complete picture of the transitions of interest. Finally, few of the researchers cited were able to account for changes in household over time. Springs, Merck, Hutchens and Plotnick effectively excluded households with any change in composition from their analysis. Only Bane and Ellwood allowed family circumstances to vary (albeit only annually) by following individuals rather than household units. Because changes in eligibility and participation are frequently associated with changes in household composition it is important to be able to measure these transitions.

The ISDP data, particularly the linked longitudinal file, do much to satisfy the requirements for a thorough analysis of turnover in transfer programs such as the Food Stamp Program. Both program participation and determinants of eligibility are reported on a monthly basis for a 12 to 15 month period. The sample is nationally-representative. Finally, indicators of changes in household composition can be constructed on a monthly basis -- much of the preliminary work done on the analysis file was designed to result in accurate monthly measures of household composition and precise timing of changes in such status. As has been discussed at

length elsewhere, the quality of the income and program participation data on the ISDP is considered to be superior to most if not all alternative survey data bases.

The organization of the remainder of this report is as follows. In Chapter II, the distinctive features of the ISDP data base, and in particular the analysis file constructed for this study, are discussed. In Chapter III the basic conceptual framework and empirical findings are presented. Finally, in Chapter IV, we summarize the major conclusions and implications of this analysis.

II. THE DATA

The source of data for this analysis is the Income Survey Development Program (ISDP) 1979 Research Panel. This survey has unique advantages for an analysis of turnover in the Food Stamp program because it provides longitudinal information on monthly food stamp participation for a period of 12 to 15 months, and the detailed income and asset information needed to simulate food stamp eligibility, for a nationally-representative sample of households. This section briefly describes the ISDP panel, the analysis file containing the subset of the data used in the present work, and notes certain remaining data limitations.

A. THE ISDP 1979 RESEARCH PANEL

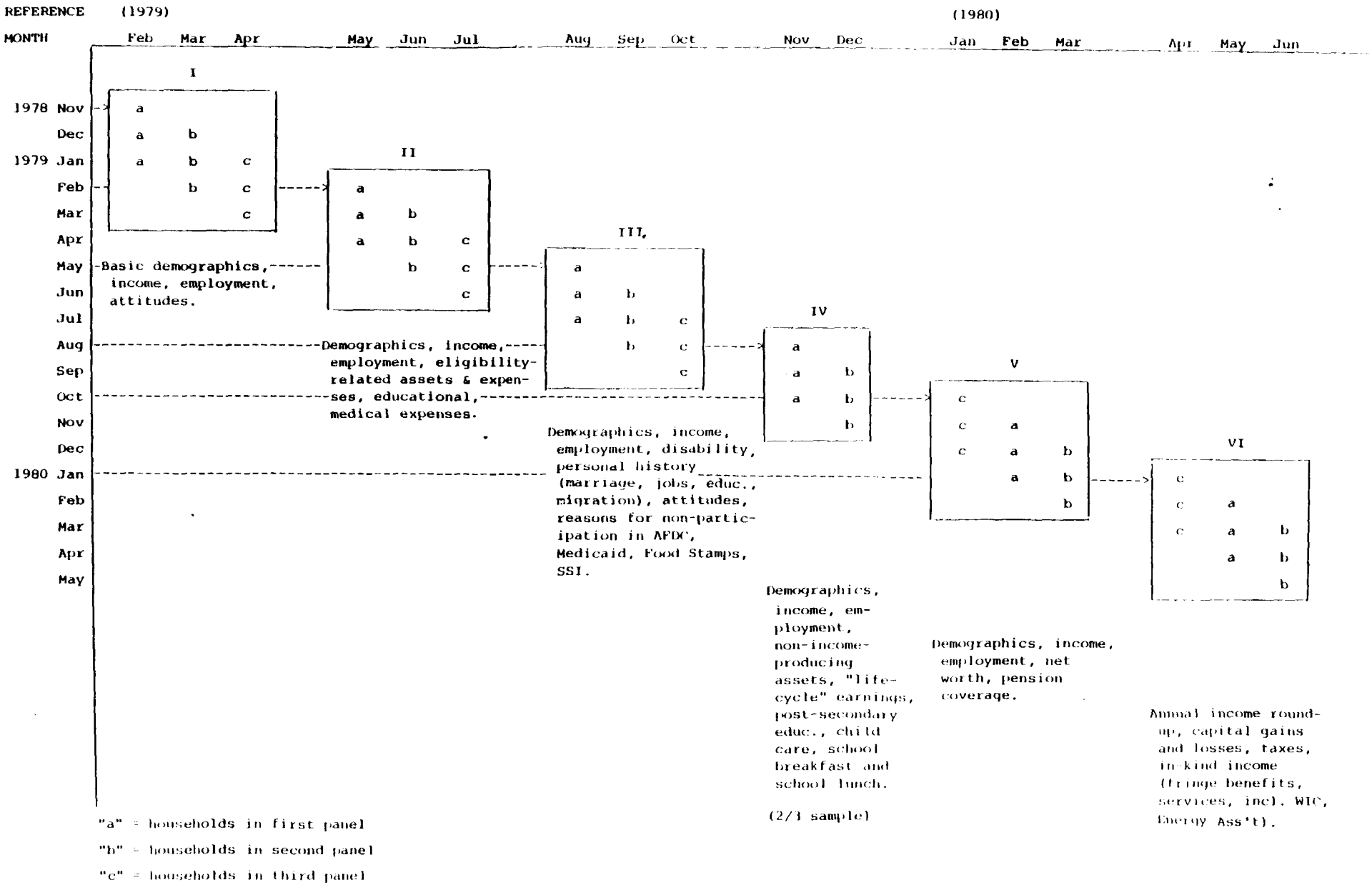
The ISDP 1979 Research Panel was a longitudinal, nationally representative survey of about 7,500 households designed as a pretest for a large scale Survey of Income and Program Participation (SIPP). Like the SIPP, the ISDP panel provides detailed information on households' economic circumstances, including participation in government programs providing cash and noncash benefits.[1]

As shown in Figure II.1, the sample was divided into three groups which were interviewed on a rotating basis. One-third of the sample was interviewed each month, so that each household was interviewed every three months. For the three "rotation groups" (designated a, b and c in Figure

[1]The 1978 and 1979 ISDP surveys were prototypes for a new, continuing household survey, the Survey of Income and Program Participation (SIPP), which was fielded beginning in the fall of 1983. For a general description of the ISDP program see Ycas and Lininger (1980).

FIGURE II. 1

Survey Waves -- 1979 ISDP Research Panel



II.1) an initial interview (the "Wave I Interview") was conducted in February, March or April 1979. Household composition and other demographic data was collected for the interview month itself, while retrospective income information (including food stamp receipt and amounts) was collected for each of the preceding three months. This monthly information was collected in four additional interviews conducted at three-month intervals.[1] A sixth and final interview collected retrospective information (primarily taxable income) for the entire 1979 calendar year. As figure II.1 illustrates, a continuous series of monthly information for the full sample was obtained for 1979. Although some information was obtained for late 1978 and early 1980, it only covers part of the sample, due to the rotating interview schedule.

In addition to the set of information obtained for every month, each interview included a set of supplemental questions which varied from wave to wave. The kinds of supplemental data associated with each wave are noted in Figure II.1, and include certain items required for determining food stamp eligibility.[2]

B. THE ANALYSIS FILE

The data base from which estimates of turnover in the program were derived was a longitudinal household file developed from the first five waves of the ISDP data base. Sociodemographic variables such as household

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[1]The only exception to this interview schedule is that no Wave IV interview was conducted for the third rotation group ("C" in Figure II.1).

[2]These supplemental items generally refer to a cross-section rather than longitudinal time period. The incorporation of such information in a longitudinal eligibility simulation is discussed in Appendix B.

composition, and ethinicity and education are included as well as indicators of food stamp receipt and all components of the eligibility determination process.

For the purpose of this study, longitudinal household units were constructed and complete income data from all waves were retained. Longitudinal units were developed according to an algorithm which defines units with respect to the status of the principal person(s) in the unit. This algorithm (discussed in Appendix A) incorporates a set of rules for "following" household sub-groups in the event of changes in household composition.

In general, a "principal person" (or persons) is identified for each unit (household) when it is first observed in the sample. This is generally the "reference person" in the terminology of the survey, and his or her spouse, if any. (These may be thought of as the heads of household.) A unit is continuous if the principal persons are unchanged, even if other persons enter or leave the unit. If one of two principal persons leaves the sample, the unit continues as long as the other principal person remains in the sample and maintains that headship role. If a unit with a single principal person is joined by another principal person (e.g., through marriage) the unit is still continuous. Finally, if two principal persons originally in the same unit begin living apart (e.g., through separation or divorce) and both remain in the sample, one of the resulting two units (selected at random) is designated as a continuation of the old unit, and the other is considered a newly formed unit. (A variety of special cases are treated as well, as described in more detail in Appendix A.) As a result of this approach, the characteristics of units

were allowed to change over time. For example, it is possible to observe an ongoing unit which at some point in the sample period gains or loses a household head or other member. For the purposes of the present analysis, the universe of households consisted of all units headed by a primary sample members.[1] This restriction was imposed primarily to overcome the absence of longitudinal weights as discussed in the next section and in Appendix A. (The weights used here are based on Wave I and do not exist for household heads not present at the first interview.) In this current study, units can be formed during any month and they can be dissolved during any month. The only exclusions were units formed after the initial interview which were headed by individuals who were not present in Wave I.

The decision to construct longitudinal units for this analysis produced a data set with many advantages for the study of turnover. However, the complexity of the longitudinal changes contained in the database in some cases had to be suppressed due to the limitations of the analytical approach. In particular, the tables presented in chapter III include a variety of household characteristics as well as several measures of turnover. Although these characteristics (with few exceptions such as race) can and do change over time, it would have complicated the presentation considerably to create separate categories for all possible changes in each such characteristic. In all of the subsequent tabulations, therefore, household characteristics are defined as of a particular month. For participation tables, units are assigned to categories based on their

[1]A primary sample member is an individual included in the initial sampling frame, and therefore followed throughout the survey to the extent possible. In later waves the ISDP surveyed all other individuals residing with primary sample members for the duration of their stay.

characteristics in the first month of participation, while characteristics as of the first month of eligibility are the basis of classification in the eligibility tables.

Eligibility for the Food Stamp Program was simulated by household, based on monthly income as well as information on expenses allowable as deductions from gross income. Asset holdings were estimated based on a rate of return and asset income. Households' income, assets and deductions were compared with July 1979 Food Stamp Program income and asset limits and deductions. For households simulated eligible for food stamps a simulated bonus amount was calculated, as well as a bonus/poverty line ratio. The details of this simulation are given in Appendix B.

C. DATA LIMITATIONS

Certain aspects of the data should be noted at this point because they may limit the applicability of some estimates for particular purposes. First, longitudinal weights have not yet been developed for the survey. The only weights available are cross-sectional weights for each wave. These weights are calculated according to the probability of selection for each part of the sample, adjusted for "controls"--distributions of the actual population projected from the 1970 Census--and for sample attrition. In each wave, the sampling ratio remains the same for a given household, but the secondary correction (to population controls and to correct for sample attrition) changes as the number of households changes (some new households are created and some drop out of the sample). In any given wave, the existing weights are designed to generate weighted estimates that are representative of the population at large for that period. The problem for longitudinal analysis is that individual

households' weights may be different in one wave than in another depending on the overall adjustments required. Use of cross section weights in a longitudinal analysis would be inappropriate because the same sample household would represent different numbers of households over time.[1]

The option of using unweighted data as the basis for estimates was not feasible because in the ISDP (like many household surveys) the probability of selection is not equal for all households in the population. The ISDP in particular "oversampled" both the low and high ranges of the income distribution to improve the reliability of estimates for those groups. As a result, both low income and high income households are overrepresented in the unweighted data.

In order to proceed with the study in the absence of longitudinal weights, "relative weights" were constructed, based on the sampling ratio but without further adjustment to population totals. The relative weights, discussed in more detail in Appendix A, make it possible to obtain unbiased estimates of the distributional characteristics of the population, but will not necessarily generate aggregate totals that match controls available from other data.[2] This issue arises in comparing the ISDP panel estimates

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[1]A simple example illustrates the potential problem: Suppose a household began receiving food stamps in February 1979, and its (cross-section) Wave I weight was 500. Suppose its cross-section Wave II weight was 1000, due to adjustments for sample attrition or other factors. If it stopped receiving food stamps in May 1979, it would contribute 1000 to the estimate of food stamp exits in May, but only 500 to the estimate of food stamp participants in April. In this case, it would tend to bias the exit rate estimate downward.

[2]Using these relative weights, the estimate of the proportion of the population receiving food stamps should be unbiased. The estimated number of participant households will not necessarily match other sources, such as program data, however.

of Food Stamp Program participation with monthly program data. As discussed in Appendix E, the aggregate weighted ISDP counts do not match the program data very well. The relative weights should generate unbiased estimates of distributions, but there remain some unexplained differences between the ISDP distributions of food stamp household characteristics and data from a 1979 caseload survey.

Second, this survey, as is true for all surveys, is subject to nonresponse both in the form of noninterviews for selected sample members and item nonresponse for interviewed observations. The effect of nonresponse in the study of turnover in the program varies depending on the study design and the type of nonresponse. In examining aggregate caseloads, for example, nonresponse on income introduces a downward bias in the counts of food stamp participation and an upward bias in food stamp eligibility, thus producing low estimates of food stamp participation. In examining distributions of participants by unit characteristics, however, nonresponse only introduces bias to the extent that nonrespondents are not randomly distributed. There are several possible approaches to avoid bias in the estimates resulting from nonresponse, one of which is imputation. The procedures used for the turnover study include restricting the universe for some estimates and selective longitudinal imputation and editing. These are discussed in Appendix A.

Third, there is a potential problem because of misreporting. In particular, there is the question of whether people tend to report receipt of an income type for an entire quarter when actually it was received only for one or two months of the quarter. A previous study analyzing quarterly income profiles using the 1978 ISDP panel data (the predecesor of the panel

used in this study) found changes in reported receipt status were much more prevalent across waves than between other consecutive pairs of months for which data were collected on the same questionnaire; this was true for most transfer income sources, but slightly less so for food stamps (Kaluzny et al., 1981, p. 12).

Finally, a note of caution is appropriate regarding the resulting eligibility variables on this data base. First, the misreporting and nonreporting of income data had a direct effect on eligibility results. Some imputations were performed for key deduction information, while income nonresponse led to a decision to exclude some units from the universe for eligibility analysis. Second, the simulation of eligibility assumed no change in program regulations over the period which was of course not true for reported participation. The provisions of the Food Stamp Act of 1979 (most notably elimination of the purchase requirement, discontinuation of automatic food stamp certification of public assistance households, and changes in allowable deductions) were implemented in early 1979. Some provisions were phased in during the first half of the year. This makes examination of participation rates conditional on eligibility inappropriate for much of the sample period.

Other important aspects of the data base upon which this study was conducted are that the full sample of units headed by primary sample members was included, the data were allocated to calendar months, and the longitudinal unit determination was made using edited monthly household and food stamp unit composition.

III. THE ANALYSIS

A. INTRODUCTION

The principal objectives of the research reported here are to obtain estimates of turnover in the Food Stamp Program and of significant variations in turnover across sociodemographic strata of the U.S. population, in order to answer important policy questions such as those identified in the introduction. This study takes advantage of unique features of the ISDP 1979 panel, a nationally-representative longitudinal sample with monthly observations on Food Stamp participation and detailed income and expense information indicating eligibility status. These data enable us to characterize turnover in the Food Stamp Program as well as replicate, for a nationally-representative sample, the measures of turnover reported in earlier studies. We identify household characteristics that are predictors of high or low turnover rates, and investigate the available evidence of the effect of participation duration on the probability of leaving the program.

1. Analytic Approach

The analytic approach employed here is based on the observation of transitions in program participation and eligibility over the course of a year. Using the longitudinal household units described in Chapter II, changes in participation and eligibility status are identified. These individual occurences of exit from or entry into the Food Stamp Program (or eligibility for food stamps) are the basis for estimating overall rates, or probabilities, of such transitions.

In order to identify predictors of food stamp turnover rates, we build on studies of participation behavior wherein program participation is hypothesized to be a function of returns to participation (benefits), returns to non-participation (wages) and other non-monetary costs and benefits of participation (leisure time and "stigma"). Since turnover is a manifestation of participation decisions, predictors of exit and entrance rates are hypothesized to be the same as those of participation. Some of these factors cannot be measured directly and instead are represented by other proxy variables. In particular, a vector of household characteristics is assumed to capture differences between households that result in different wage opportunities and stigma effects. Benefit levels have not been included directly in the present analysis, in part due to difficulties in predicting benefits for sample units with extensive income nonresponse.[1] However, other characteristics which have been included (such as receipt of other welfare, education, and household composition) are likely to be correlated with income and thus with expected benefit.

Both tabular and multivariate analyses were conducted. The tables were designed to present the aggregate measures of turnover calculated, as well as the different estimates of these measures calculated for population subgroups. This approach is useful in describing the extent of turnover in program participation and in eligibility. It also identifies some of the household characteristics that are associated with higher or lower than average turnover. However, because only one characteristic can be

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[1]Refer to the discussion of measuring eligibility for food stamps below and in Appendix B for further details.

controlled for at a time, it is not possible to identify the independent effects of various stratifiers on turnover.

The multivariate approach uses maximum likelihood estimation techniques to estimate rates of transition as functions of explanatory variables (characteristics). The transitions are measured in the same fashion as for the calculations used in the tables, and the explanatory variables are, in general, those identified in the tables as well. The advantages of the multivariate analysis are the ability to separate out the independent effects of particular variables, to quantify the impact of these variables on turnover rates, and to attach significance levels to these estimates.

Some of the particulars of the tabular and multivariate analysis are described below.

Tabular Analysis. Tabulations that are broadly descriptive of Food Stamp Program transitions observed in the calendar 1979 data have been provided. These include duration measures such as the distribution of the number of months of participation observed during 1979, the occurence of multiple spells of program participation among sample households in 1979, and the proportion of food stamp recipiehts observed to participate for only part of the year. These estimates are of interest for the broad characterization of transitions represented in the ISDP sample that they provide.

Further, several specific indicators of turnover in food stamp participation and eligibility are presented. These include ratios of annual to monthly food stamp participation and eligibility, and rates of entry to and exit from program participation and eligibility. The concepts

and methods for calculation of these measures are worthy of brief mention here.

Annual to monthly ratios are measures of program turnover that have been used in earlier work such as that of Merck (1980) and Springs (1977a,b). With respect to participation, this ratio is calculated by dividing the number of households who participate in the program at any time during the course of a year by the number who participate in a typical or average month. Such a ratio can be used to extrapolate a monthly caseload estimate to an "annual ever-on" estimate.[1] The larger this ratio is, the more turnover exists in the program; if the caseload were completely static, the annual to monthly ratio would be equal to one. Ratios of "annual ever-eligibles" to average monthly levels of food stamp eligibility are constructed as well, and illustrate the turnover in eligibility which in part generates program turnover. Finally, both of these measures are constructed for important population subgroups and used to compare turnover across different types of households.

Entrance rates are indicative of both program turnover and of participation probabilities, and reflect the likelihood of households gaining access to the Food Stamp Program. The entrance rate into participation is here defined as the ratio of new entrants in month m to non-participants in month m-1. Hence, it is the probability of beginning to participate in a given month. Entrance rates are also calculated with respect to eligibility and express the probability of becoming eligible in

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[1] If the annual to monthly participation ratio is R, then R times the average monthly caseload is the number expected to participate at some time during the year.

a given month. These are also calculated separately by household characteristics.

The exit rate from the Food Stamp Program in a given month is calculated as the number of exits in month m (units who were on the program in month m-1 but not in month m) divided by the number of participants in month m-1. The interpretation of an exit rate is straightforward--it is the likelihood of leaving in a given month; for the aggregate (or a subgroup) it is the proportion of the caseload expected to leave the program by the next month. The exit rate reflects the ability of households to escape economic hardship and welfare dependency, and is in some way an indicator of alternative opportunities available to participant households. In a steady state of no program expansion or contraction, this will also be what is sometimes thought of as the turnover rate--the proportion of the caseload that is replaced each month. (In a period of program growth, such as most of 1979, entrances will exceed exits each month, with new entrants more than replacing the exiters.) Exit rates have been constructed for households of different characteristics and are a useful point of comparison across household types.

Monthly exit and entrance rates are averaged to obtain annual estimates of "typical" monthly rates. Such estimates represent the average over all households present during the year. It should be noted that these estimates differ from what may be referred to as "cohort" exit or entrance rates. If only a particular cohort of households--e.g., all January 1979 participants--is followed through the year, and only their own exit rate is

calculated each month, that rate may differ from the overall average rates used here.[1]

These two alternative exit rates measure somewhat different things. The aggregate monthly exit rate is appropriate to estimate, for any given month, the proportion of the food stamp caseload expected to leave the program by the next month. Unless the period considered is only one month, the aggregate rate does not estimate the portion of the current caseload that will have left the program within a given period, and a cohort exit rate should be used instead.

The various estimates used in this paper measure different aspects of food stamp turnover. Although the annual-monthly participation ratio has perhaps been most widely used in related studies, no single statistc describes food stamp turnover completely, nor is any particular estimate clearly superior to the others.

The annual-monthly participation ratio is an indicator of the relationship of participation levels at a point in time to participation over a longer period of time--in particular it provides a means of estimating the number of households who are served by the program during the course of a year (a statistic not directly available from program data). Exit rates describe monthly turnover as a proportion of the food stamp caseload. In addition to describing participation behavior, these

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[1]This cohort's July exit rate, for example, will be the ratio of households who participated in January (or before) through June and who exited in July, to all households who have been participating (at least) since January. The average exit rates presented in our tables include households who entered the program more recently, in both the numerator and denominator. (See Appendix C for a more complete discussion of this and related issues.)

rates relate closely to administrative concepts such as case openings and case closings. Entrance rates describe food stamp participation relative to the population as a whole, and estimate the probability of beginning to participate. Such rates, together with population statistics, predict the number and characteristics of households expected to enter the program in a given period.

Multivariate Analysis. The tabular analysis provides an informative look at the general level of turnover in the Food Stamp Program, as well as the manner in which entry and exit rates vary among segments of the population. However, as is apparent, tabular analysis does not permit the analyst to isolate the separate effects of the numerous variables that influence food stamp turnover.

Recently a method for analyzing data on the occurence of events over time has been developed by Nancy Tuma and her colleagues (Tuma et al., 1979). This method is embodied in a computer program known as the RATE model, which is described in Tuma (1980). The advantages of using this method of analysis are as follows:

- One can control simulataneously for the effects of several explanatory variables.
- Predicted exit and entry probabilities will lie in the interval between zero and one, which would not necessarily be true of such approaches as linear regression analysis.
- Statistical tests for the significance of explanatory variables can be performed in a manner similar to that used in other types of multivariate statistical analysis.

As a computational matter, implementation of the RATE model involves the solution of a system of nonlinear equations by iterative methods; as such, it is computationally more burdensome than more familiar

econometric techniques such as linear regression models. This computational expense increases substantially with each additional explanatory variable that is included on the right-hand side of the entry and exit equations. Accordingly, we have focused on a set of household characteristics that would seem to be of particular interest to FNS, and that also appear to be significantly correlated with entry and exit rates, based on the preliminary evidence contained in the tabular analysis presented above. Hence, the basic model we have used is of the form:

$$\text{entry rate} = f(x_1, x_2, x_3, x_4 \ldots, x_9)$$

$$\text{exit rate} = g(x_1, x_2, x_3, x_4 \ldots, x_9)$$

where

x_1 = a dummy variable that takes a value of unity if there is an elderly or disabled person in the household, and zero otherwise

x_2 = a dummy variable that takes a value of one if the household (or more precisely, the head of the household) is white, and zero otherwise

x_3 = a dummy variable that takes a value of one if the household has a single head, and zero otherwise

x_4 = a dummy variable that takes a value of one if the youngest child in the household is under the age of six, and zero otherwise

x_5 = a dummy variable that takes a value of one if the youngest child in the household is between the ages of six and 18 inclusive, and zero otherwise

x_6 = a dummy variable that takes a value of one if the household receives AFDC, and zero otherwise

x_7 = a dummy variable that takes a value of one if the household has at least one employed person, and zero otherwise

x_8 = a dummy variable that takes a value of one if the household has a single head, and also has one or more children under 19, and zero otherwise (i.e., an interaction term).

In addition, the ratio of the simulated food stamp bonus value to the official poverty line for that household (x_9) is included in some variants of the model, in order to determine whether the generosity of food stamp benefits affects the behavior of households. This variable is constructed in a manner that is essentially similar to the food stamp generosity variable used by Czajka (1981).[1]

In the following sections we present and discuss our findings, based on both the tabular and multivariate analysis. We discuss, first, evidence pertaining to turnover in Food Stamp Program participation, which represents the primary focus of the analysis. Second, estimates of turnover in eligibility are presented, again drawing on both the tabular presentation of the calculated transition probabilities, and on the multivariate analysis of these rates.

B. TURNOVER IN FOOD STAMP PROGRAM PARTICIPATION

1. Aggregate Estimates

The evidence from the ISDP panel, via tables and multivariate analysis, is that turnover in food stamp participation is high. We estimate the ratio of annual to monthly participation at 1.74, indicating that the number of households served by the program over the course of a year is about 70 percent greater than the caseload in an average month (Table III.1). For example, program data for 1979 indicate that the average

[1] All of these explanatory variables are measured as of the month that the spell of participation or nonparticipation commenced (or the first month the household appears in the sample, as the case may be).

Table of Contents

TABLE III.1

INDICATORS OF TURNOVER IN FOOD STAMP PROGRAM PARTICIPATION BY SELECTED UNIT CHARACTERISTICS

	Annual/Monthly Participation Ratio	Exit Rate	Entrance Rate	Spells of Participation		Months of Participation			
				One	Two or More	1-3	4-6	7-11	12
All Households	1.74	7.3%	0.53%	88.5%	11.5%	27.5%	13.8%	25.4%	33.4%
AFDC Status									
Recipient	1.07	2.5	1.13	91.4	8.6	15.8	20.1	34.9	29.2
Nonrecipient	2.01	8.9	0.47	88.0	12.0	29.5	12.7	23.7	34.1
Other Welfare									
Recipient	1.34	3.2	0.86			31.9	10.4	19.3	38.4
Nonrecipient	1.81	7.7	0.51			27.2	14.0	25.8	33.0
Age of Head									
Under 25	1.89	7.1	0.64	91.4	8.6	20.1	12.2	32.3	35.4
25-44	1.81	7.7	0.59	87.5	12.5	26.9	16.0	24.2	32.9
45-59	1.71	7.9	0.41	87.0	13.0	33.5	18.1	18.6	29.9
60-64	1.81	7.7	0.20	88.2	11.8	28.9	8.1	22.6	40.0
65+	1.51	5.7	0.56	90.5	9.5	26.5	6.6	31.2	35.6
Family Status									
Married w/children	1.92	11.7	0.47	84.9	15.1	34.9	24.8	19.3	21.1
Single w/children	1.63	4.7	2.51	88.9	11.1	21.5	11.2	26.9	40.3
Married, no children	1.86	8.5	0.16	92.0	8.0	32.7	10.4	26.9	30.2
Single, no children	1.69	6.4	0.52	90.5	9.5	25.1	6.1	29.6	39.4
Race									
White	1.85	8.2	0.42	88.9	11.1	33.4	13.6	21.8	31.2
Nonwhite	1.56	5.9	1.45	87.8	12.2	16.3	14.2	32.1	37.5
Household Size									
1	1.59	5.6	0.48	89.9	10.1	19.3	3.9	37.2	39.6
2	1.90	7.4	0.32	91.6	8.4	23.0	19.4	17.3	36.2
3-4	1.91	9.3	0.48	87.3	12.7	40.2	13.8	19.4	26.6
5+	1.59	6.1	1.25	86.5	13.5	18.2	16.9	29.4	34.9
Children Under 19									
0	1.73	6.9	0.34	90.8	9.2	27.0	7.2	28.8	37.0
1	1.93	7.4	0.59	86.4	13.6	25.8	25.2	21.1	27.9
2+	1.68	7.6	0.92	87.3	12.7	28.6	14.3	24.3	32.8
Children Under 6									
0	1.77	7.5	0.42	89.1	10.9	27.4	12.9	24.2	35.5
1	1.63	6.3	1.02	85.2	14.8	21.8	17.0	34.1	27.1
2+	1.84	8.1	1.05	92.4	7.6	43.1	11.9	11.1	33.8

continue

Table of Contents

TABLE III.1 (continued)

	Annual/Monthly Participation Ratio	Exit Rate	Entrance Rate	Spells of Participation		Months of Participation			
				One	Two or More	1-3	4-6	7-11	12
Highest Grade Completed[2]									
Less than 9th	1.66	6.0	1.21	89.9	10.1	24.2	9.3	26.2	40.3
9th-11th	1.71	6.1	.90	89.2	10.8	28.6	11.2	21.2	38.9
12th	1.71	9.0	.30	85.7	14.3	22.0	21.1	31.7	25.2
Some college	2.49	13.0	.13	89.4	10.6	51.8	17.9	16.4	13.7
Presence of Earners									
Present	2.00	10.9	.40	87.8	12.2	35.3	15.7	25.3	23.6
Not Present	1.57	4.3	1.08	89.3	10.7	18.7	11.6	25.4	44.3
Elderly[3] or Disabled Persons									
Elderly	1.51	5.3	.43	93.1	6.9	25.5	5.5	30.4	38.5
Disabled	1.86	6.3	3.22	88.3	11.7	23.6	13.6	12.3	28.4
Both	1.46	5.5	.68	81.7	18.3	25.8	8.4	22.9	43.3
Neither	1.82	8.5	.49	87.3	12.7	27.5	16.4	26.6	29.4

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel. (See text for details of particular calculations.)

[1]GA and/or Emergency Assistance.
[2]Head of household.
[3]60 or over.

monthly caseload in 1979 was 6.5 million households (USDA, 1979). This annual-monthly ratio implies that 11.3 million households--about 14 percent of all households--received food stamps sometime during 1979. The ratio reported here is somewhat higher than those estimated by Springs (1977) and Merck (1980) using data on control group families from the Seattle and Denver Income Maintenance Experiments (SIME/DIME). Springs' estimate of the ratio of households participating in a single month to those participating over the course of a year was 1.36, while Merck's estimates ranged from 1.39 in 1971 to 1.69 in 1973. Of course, the data on which these earlier studies were based are not representative of the U.S. population as a whole. They also refer to earlier time periods, while the 1979 ISDP Panel data cover a period following significant changes in the Food Stamp Program.

Most of the food stamp households observed in our data received food stamps for only part of the year. About two thirds of the sample households who received food stamps during 1979 participated in the program for less than the full year and nearly a third of the participants received food stamps for 3 months or less in 1979.[1] Only about one-third of all food stamp recipient households observed received food stamps "continuously" (that is, for all months present in the sample). In other words, a

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[1]These estimates are based on households present in sample for the full calendar year. However, when households present for only part of the year are included, the results are similar. Note that these estimates, although illustrative of caseload composition in a given year, do not imply estimates of average duration of spell length due to the restricted sample period. Households with fewer than 12 food stamp months in 1979 may be observed during spells that began before or ended after that year.

truly "long-term caseload" may account for only about a third of the households who receive food stamps in a given year.

The 1979 sample period is rather short for observing individual households' food stamp spells over time. However, even during this relatively short observation period, about 12 percent of food stamp households experienced more than one spell[1] of participation, as shown in Table III.1. This would seem to indicate that recidivism in the Food Stamp Program--households returning to the program after not participating for some interval--may be high.

The average monthly rate of exit from the Food Stamp Program is estimated at over seven percent, as shown in Table III.1. That is, in a given month, over seven percent of the caseload may be expected to leave the program by the next month. The exit rate in a given month is the proportion of the previous month's caseload (or of a caseload subset) that has now left the program, and is estimated from caseload counts and exits from the program[2] in each month of 1979. In the aggregate, then, a substantial share of the caseload "turns over" each month, with perhaps 500 thousand households[3] leaving the program and being replaced, in a steady state of no program growth, by a similar number of new entrants. (When the

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[1]Estimate based on "true spells"--spells of participation separated by an interval in which the household was present in the sample but not receiving food stamps.

[2]This calculation is based on "true exits" only; where a true exit is, generally speaking, one where the unit remains in the sample but is observed to be no longer receiving food stamps, as opposed to a unit who leaves the sample following some period receiving food stamps.

[3]This estimate is based on an average monthly caseload of 6.5 million in 1979, as indicated by program data.

program is expanding, entrances will exceed exits, and if contracting exits will exceed entrances.)

The program entrance rates measure inflows to food stamp participation. These rates, expressed relative to total population, are much lower than exit rates but in fact represent flows into the program that approximately equal outflows (exits).[1] The average monthly entrance rate as shown in Table III.1 is 0.5% per month--that is, the average probability of a nonparticipant in a given month becoming a participant in the next month is about half of one percent.

2. Variation by Household Characteristics

Turnover rates in the Food Stamp Program, however measured, appear to be quite different for different kinds of households. The various measures of turnover presented for different population subgroups indicate that the more "permanent" part of the food stamp caseload includes households participating in AFDC and other welfare programs, and elderly households. A more transient group of participants includes younger non-welfare households with more labor force attachment and education.

The disaggregated annual-monthly participation ratios presented in Table III.1 are lowest for public assistance recipients and for elderly households. The annual-monthly participation ratio for AFDC recipients is only 1.07, and is the lowest ratio calculated for any of the subgroups identified here. This ratio is 1.51 for elderly households, while the overall average is 1.74. In contrast, households with earners present have

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[1]The weighted ISDP counts show about 3.7 million entrances and 3.2 milliion exits over the course of 1979, consistent with the observed increase in the sample caseload for that period.

an above-average annual-monthly ratio of 2.0, and for households in which the head has at least some college education the ratio is 2.49.

In comparing annual-monthly ratios for different population subgroups, (as with the tabular analysis generally) the one-way distributions include combined and perhaps interacting effects. For example, single parent households have lower than average turnover as indicated by annual-monthly participation ratios. This group includes most of the AFDC-recipient households, however, who as a group have the lowest turnover, so that it is not possible to determine whether family status or welfare recipiency explains more of the difference in turnover.

Exit rates for various demographic subgroups are also shown in Table III.1. The average monthly exit rate for all food stamp households is 7.3 percent as mentioned above. The exit rates for different household types are strikingly different and parallel some but not all of the patterns seen in the annual-monthly ratios. The average monthly exit rate for AFDC recipients, at 2.5 percent, is about one-third the average rate, as further evidence of this group's distinctive pattern of participation. Exit rates are also low for single-parent households (the compositional effect again), for elderly households, nonwhite households and households with low educational attainment.

Despite the inherent limitations of this univariate tabular analysis the distribution of exit rates (as well as other measures) show some apparently stable and intuitively appealing relationships. Exit rates increase without exception, for example, with increasing educational attainment of the household head, consistent with improved earnings potential associated with more schooling. The distribution by age of the

household head is also interesting. Exit rates are somewhat below average for households headed by individuals under 25, but rise from the mid-twenties to middle age, declining again at and after retirement age. This reflects both individual lifetime earning profiles and compositional effects, since AFDC households are heavily represented in the youngest groups. The number of children present has an interesting association with exit probabilities. Rather than decreasing with the presence of additional children (as might be expected based on AFDC households' very low rates) exit rates actually increase montonically with the number of children (under 19) present. Households with one child under 6 have lower exit rates than average, but households with two or more preschool children have exit rates even higher than those with no children under 6. Here again compositional effects are important and cannot be separated out in simple tabulations. Elderly households (with low turnover) are included in the no-children category, for example. The higher exit rates for households with several children may simply reflect the fact that more two-parent households and more earners are included in this group. Note that these are both high-turnover groups--the exit rate for households with earnings during the year is more than twice that for households with no earnings, and the exit rate for two-parent households at 11.7 percent is the second highest rate for any of the subgroups considered here.

Rates of entry into the Food Stamp Program for different types of households, expressing the average monthly probability of a household of a given type beginning to receive food stamps (given that it did not receive food stamps in the previous month) are also shown in Table III.1. Like exit rates, entry rates exhibit wide variations across different types of

households. The entrance probability is only 0.2 percent for married couples with no children, but is 2.5 percent for single-parent households, for example, indicating that the latter groups' likelihood of entering the program in a given month is about ten times that of the former. For several of the distributions, high entry rates and low exit rates are associated with the same characteristics. For example, public assistance recipients have very high entry rates and very low exit rates compared to households not receiving PA. Households with more education and those with earners have low entry rates and high exit rates. (On the other hand, the presence of several children is associated with high entry rates and somewhat higher than average exit rates.) Given combinations of entry and exit rates indicate participation rates for various subgroups, in fact. Households with high entry rates and low exit rates (e.g., AFDC households) have high participation rates--are more likely to be participating at any given time. A high exit rate is generally an unambiguous indicator of a high-turnover group (viz. households with earners), while the entrance rate, which is linked to participation probabilities, does not by itself always provide clear evidence on turnover. Recall that single-parent households (or AFDC households) and elderly households both appear to be low-turnover types based on annual-monthly participation ratios and exit rates. However, although single parent households and AFDC households have very high entry rates, elderly households have average or below-average entry rates.

Broader turnover measures such as "continuity," number of food stamp spells observed, and number of total months of food stamp receipt,

also provide a feel for the variation across household types in food stamp participation patterns observed in the sample period.

The frequency distribution of the number of months of food stamp receipt, for selected types of participating households (households who were included in the sample for all of calendar 1979[1]), is shown in Table III.1. In examining such a distribution, we expect "low turnover" households to have more months of participation and "high turnover" households to have fewer months in a given year. Broadly speaking, this seems to be the case. About 60 percent of all households participating have more than six months of food stamps (and 33 percent have food stamps for all 12 months). Households characterized earlier as "low turnover"--such as elderly households, single parent households, and AFDC households, are all at least somewhat more concentrated in the 6 or more months category. Households with earners, those with more education, and two-parent households all tend to have fewer months of food stamp receipt. The number of reported months of participation thus is a rough indicator of differences in relative duration across participating households.

Households are classified as "continuous" participants in Table III.1 if they receive food stamps in every month present in the sample. If a household sometimes receives food stamps but is also present in the sample and not receiving food stamps for some period, it is classified as

[1]The distributions are similar, although necessarily skewed slightly toward fewer months, when so called "part-year" households are included. A similar table in Appendix D shows the distribution of food stamp months for all ever-participating households in the sample.

"non-continuous." As seen before, one third of all food stamp households were always receiving food stamps when sampled. In several cases, household characteristics associated with low annual-monthly participation ratios and low exit rates are also associated with a higher than average occurance of continuous participation in the sample. For example, about 40 percent of single parent households, of no-earner households, and of elderly households are in the continuous category. Likewise, only about 20 percent of two-parent households and households with some college education of the head are in the continuous category.

An apparent anomaly in this table (as well as in the frequency distribution of food stamp months) is that AFDC households are no more heavily represented in the continuous category than are non AFDC households. Based on the very low exit rates and low annual-monthly participation ratios for this group it might be expected that a large proportion of AFDC households would be observed as continuous participants. On closer consideration, however, the effect of entrance rates must be taken into account. In fact, AFDC households have among the highest rates of entry into the Food Stamp Program. In a discrete time period (as the 1979 sample) relatively large numbers of AFDC households enter the program in each month. Even though these entrants may be (and likely are, based on low exit rates) embarking on long spells of program participation, all such

households entering after they are first included in the sample are of necessity excluded from the "continuous" group.[1]

The opportunity to observe multiple spells of food stamp participation are limited by the one-year sample period available for our analysis. It should be noted that the food stamp spells discussed here are by and large truncated or in-progress spells. Within the discrete sample period, observed spells tend to be either continuous in-progress spells, spells ending in the sample period that began before the period, or spells beginning during the sample period that will end sometime after that period. However, as Table III.1 shows, 11.5 percent of all food stamp households in the 1979 panel were observed to have more than one spell of participation.[2] Given the short sample period, even 11 percent with multiple spells is striking.

The differences in multiple spell occurrence across households are not large, although characteristics previously associated with low turnover, such as receipt of AFDC or presence of elderly, are also

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[1]The effect of high entrance rates on this continuous/non-continuous classification may best be illustrated by a simple hypothetical example. Suppose two groups in the population (call them A and B) have similar very low exit rates, so that during a finite period of observation their food stamp participation is static. During this period all "ever-participants" will also be continuous participants. Then suppose the entrance rate of group A is marginally higher than that of group B, so that some new households of type A enter the program during the observation period. Note that all of these entrants will necessarily be classified as "non-continuous" and group A will now have a smaller proportion classified as continuous than does group B, even though their exit rates are equal. This result extends to the case in which a group with a lower than average exit rate may have the same (or even higher) "non-continuous" proportion than lower exit rate groups if its entrance rate is high enough.

[2]These estimates are based on "true" spells--those separated by an interval in which the household was present in the sample but not receiving food stamps.

associated with a lower occurrence of multiple spells. About 90 percent of all elderly households and of AFDC households have single spells, compared to an average of 88 percent for all food stamp households.

The multivariate analysis of turnover in program participation, using the RATE model described earlier, provides estimates of the independent association of household characteristics with different turnover rates. The results of estimating our basic model of transitions to and from participation in the Food Stamp Program are presented in Table III.2. The precise interpretation of these coefficients is not entirely straightforward, as entry and exit rates are complicated functions of the coefficients, as explained in detail in Appendix C. For now we note that the qualitative effect of an explanatory variable on entry and exit rates is indicated by the sign of its coefficient, just as would be the case in the more familiar linear regression model. For instance, the coefficient of the elderly/disabled dummy variable is positive in the entry model, and negative in the exit model. This indicates that households containing elderly or disabled persons are more likely to enter the program, and less likely to exit from it, ceteris paribus.

In general, the results are consistent with the results of the tabular analysis presented above, in that the household characteristics that appear to be associated with high entry and exit rates on the basis of the tabular analysis are also those that appear to be associated with high entry and exit rates on the basis of the multivariate analysis. In parti-

TABLE III.2

ESTIMATED COEFFICIENTS OF A MODEL OF TURNOVER IN FOOD STAMP PARTICIPATION

Independent Variable	Entry Model		Exit Model	
Constant	-5.374		-2.841	
Elderly/Disabled	.132	(0.92)	-.683	(-3.59)***
Nonwhite	1.601	(14.89)***	-.357	(-2.42)***
Single head	.212	(1.51)*	-.438	(-1.98)**
Youngest child under 6	.793	(4.37)***	-.067	(-0.27)
Youngest child 6-18	.378	(2.13)**	-.037	(-0.14)
AFDC recipient	1.223	(4.26)***	-.349	(-1.62)*
Earner present	-1.353	(-9.71)***	.901	(5.59)***
Single head, child present	.743	(3.48)***	-.333	(-1.14)
X^2	454.24***		116.79***	
Number of observations	7,276		667	

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

Note: Asymptotic t statistics are in parentheses.

* Significant at .10 level (one-tailed test).
** Significant at .05 level (one-tailed test).
*** Significant at .01 level (one-tailed test).

cular, the following findings are both statistically and substantively significant.[1]

- Nonwhite households who are not in the program are far more likely to enter the program in any given month than otherwise similar white households; furthermore, nonwhite households that are receiving food stamps in any given month are likely to stay on the program longer (i.e., have lower exit rates) than otherwise similar white households.

- Households within which there is no currently employed person are both more likely to enter the program and less likely to exit the program, ceteris paribus.

- Households with one head and households with an elderly or disabled person tend to stay on the program longer than other households, all other things being equal.

- Households that receive AFDC are both more likely to enter the program, and less likely to leave, than otherwise similar households.

This last finding, especially the higher entry rate of AFDC households, is especially interesting because it has been hypothesized by some previous researchers that there is a "stigma" effect that acts as a sort of psychological barrier to participation in income maintenance programs (e.g., see Czajka, 1981). These researchers have found that participation in one program is generally correlated with participation in other programs, and our findings tend to confirm theirs. This behavior can be explained in two ways. First, it may be the case that there are households whose members are psychologically less averse to receiving welfare than others, and hence are more likely to apply for benefits from all

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[1]We abstract from the possibility of interrelationships among the explanatory variables. For instance, it could be argued that the "true" effect of the presence children is understated, because there is an indirect effect of the presence of children on AFDC recipiency, and hence on food stamp turnover.

programs. Second, a household may perceive little or no additional stigma from applying for and receiving benefits from other programs. Of course, these explanations are not mutually exclusive, and it is difficult, if not impossible, to disentangle them with the data available to us.

The estimated coefficients of the RATE model can be used to predict monthly entry and exit rates, annual participation rates, the ratio of annual to monthly participation rates, and the expected duration of spells of participation for a hypothetical household with any combination of characteristics.[1] In order to make the implications of our estimated models more transparent, we have calculated the values of these functions for certain combinations of characteristics.

Specifically, our approach to this presentation is as follows. First, we define a "baseline" household that has characteristics that are fairly typical: a white household with two heads, at least one of whom is employed, and no children. Furthermore, this hypothetical household does not receive AFDC, nor does it contain an elderly or disabled person.[2] We have calculated predicted monthly entry and exit rates and other measures of turnover for the baseline household; these results are presented in the first row of Table III.3.

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[1]Generating these predicted values is not a straightforward matter, however. A detailed description of the manner in which these numbers are calculated is provided in Appendix C. Furthermore, these calculations assume that the conditions underlying the simple Markov model are satisfied; in particular that the explanatory variables account for all or most systematic variation in entry and exit rates. As we shall see below, we have reason to believe that this condition is satisfied.

[2]In more formal terms, we assume that $x_7 = 1$, and that all other explanatory variables take a value of zero.

TABLE III.3

PREDICTED MEASURES OF
TURNOVER IN PARTICIPATION

Household Type	P(Entry)	P(Exit)	Monthly Participation Rate	Annual Participation Rate	Annual/ Monthly Ratio	Predicted Duration
Baseline	0.11	13.4	0.9	2.1	2.46	7.5
Elderly/disabled	0.13	7.0	1.8	3.3	1.76	14.3
Nonwhite	0.56	9.5	5.6	11.3	2.02	10.5
Single head	0.14	8.9	1.6	3.1	1.97	11.3
Youngest child under 6	0.25	12.6	1.9	4.6	2.36	8.0
Youngest child 6-18	0.16	12.9	1.2	3.0	2.41	7.7
AFDC recipient	0.39	9.6	3.9	7.9	2.04	10.4
No earner present	0.45	5.7	7.4	11.8	1.61	17.7
Single head, child under 6	0.67	6.0	10.0	16.3	1.64	16.6
Single head, child 6-18	0.44	6.2	6.6	11.0	1.67	16.2
Single head, elderly, no earner present	0.65	1.9	25.6	30.7	1.20	53.2

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

The numbers in the other rows of Table III.3 are derived by altering the assumed values of the explanatory variables one by one. For instance, the row labeled "elderly/disabled" pertains to a hypothetical household that contains an elderly or disabled person, but is otherwise similar to the baseline household defined alone, and so forth.[1] As one would expect based on the results in Table III.1, there are certain identifiable types of "low-turnover" households, such as households with an elderly or disabled person and households with no person who is currently employed, that are characterized by a low ratio of annual to monthly participation rates and a high predicted duration on the program.

The last three rows illustrate the effect on a household of having two or more characteristics that are associated with low turnover. The first two of these rows simulate the case of a household headed by a single person and containing a child who is under 6 (in the first case) and over 6 (in the second case). The last row describes a hypothetical household consisting of a retired elderly person who lives alone. Our results imply that if he/she receives food stamps, he will be on the program for an average of over four years before exiting, several times longer than the expected duration of participation for the population as a whole.

One application of this analysis might be the application of our findings to a microsimulation model of food stamp participation. In this application, a predicted ratio of annual to monthly participation rates would be multiplied by a simulated probability of participation in a month

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[1]Some combinations of characteristics are not very plausible; e.g., AFDC households without children. These calculations are presented in order to illustrate the partial effects of certain variables holding other things constant.

to arrive at a simulated probability of participation over the course of a year. This annual participation rate would be simulated only for the subsample of the microsimulation data base that had been simulated to be eligible. Thus, it is interesting to know whether levels of turnover in general, and annual/monthly participation ratios in particular, are different for eligible households than for all households.

Accordingly, the RATE model was re-estimated for a subsample of 1,850 households that were determined to be eligible according to the procedure described in Appendix B.[1] The results of this estimation are presented in Table III.4. Predicted annual/monthly ratios, and other functions of entry and exit rates, are provided in Table III.5.[2] These tables can be compared with Tables III.2 and III.3, which are largely analogous. An examination of these tables shows that the estimated effects of the explanatory variables are quite similar for eligible households, as compared to all households. Also, our findings imply that although the generosity of benefits does not appear to induce eligible nonparticipants to enter the program, it does seen to cause participant households to stay on the program longer, ceteris paribus. These findings are consistent with the earlier results reported by Czajka (1981), who found that benefit generosity was associated with higher participation rates; indeed, these

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[1]Again, eligibility, like other variables, is measured as of the date that the first spell of participation or nonparticipation commenced. Also, it should be noted that there are differences between the eligibility simulation used in this report and the simulation procedure used in the microsimulation model.

[2]For the purpose of Table III.5, the "baseline" assumed value of Food Stamp benefits was 20 percent of the poverty line; the alternate assumption (labeled "high benefits" in the table) is 30 percent.

findings provide further insight into the mechanism by which this result takes place.

Also, comparison of Table III.3 and III.5 indicates that turnover measures such as the annual/monthly ratio and predicted duration show somewhat less turnover for eligible households than for the population as a whole.

Finally, we estimated a variant of the model in which exit and entry rates for a given household are not determined only by that household's characteristics (i.e., the values of the explanatory variables), but also a random error term, along the lines suggested by Salant (1977) and Lancaster (1979). Table III.6 presents the estimated parameters of this model, based on data from the same sample of 7,943 households used in Table III.2. The findings in this model are quite similar to those of the basic model presented in Table III.2. In particular, the small estimated variance of the error term in the exit model implies that there is little heterogeneity in exit rates (as might result from either within-group differences or from changes in individual transition rates over time) that is not accounted for by our explanatory variables. Hence there should be minimal bias in the estimated mean duration of spells of participation presented in Tables III.3 or III.5. Since the calculation of such certain functions as predicted annual/monthly ratios under the assumptions of the model presented in Table III.6 is far more involved than in the basic model presented in Table III.2, we use the basic model as the basis for our analysis.

TABLE III.4

ESTIMATED COEFFICIENTS OF A
MODEL OF TURNOVER IN FOOD STAMP
PARTICIPATION AMONG ELIGIBLE HOUSEHOLDS

Independent Variable	Entry Model		Exit Model	
Constant	-4.461		-2.499	
Elderly/Disabled	-0.67	(-0.04)	-.788	(-3.30)***
Nonwhite	1.278	(9.79)***	-.173	(-0.98)
Single head	-.102	(-0.63)	-.499	(-1.83)**
Youngest child under 6	.242	(0.94)	.108	(0.32)
Youngest child 6-18	-.009	(-0.03)	.063	(0.18)
AFDC recipient	1.112	(2.93)***	(-.702)	(-2.38)***
Earner present	-.511	(-2.95)***	.810	(3.93)***
Single head, child present	.793	(2.81)***	-.277	(-0.74)
Benefit/poverty line ratio	.475	(0.66)	-2.304	(-2.04)**
X_2	130.66***		70.82***	
Number of observations	1,344		506	

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

Note: Asymptotic t statistics are in parentheses.

* Significant at .10 level (one-tailed test).
** Significant at .05 level (one-tailed test).
*** Significant at .01 level (one-tailed test).

TABLE III.5

PREDICTED MEASURES OF
TURNOVER IN PARTICIPATION
AMONG ELIGIBLE HOUSEHOLDS

Household Type	P(Entry)	P(Exit)	Monthly Participation Rate	Annual Participation Rate	Annual/ Monthly Ratio	Predicted Duration
Baseline	0.72	11.0	6.1	13.3	2.16	9.1
Elderly/disabled	0.69	5.1	11.9	18.3	1.55	19.5
Nonwhite	2.57	9.2	21.8	41.3	1.89	10.9
Single head	0.66	6.8	8.9	15.3	1.72	14.7
Youngest child under 6	0.91	12.1	7.0	15.8	2.27	8.3
Youngest child 6-18	0.71	11.6	5.7	12.8	2.23	8.6
AFDC recipient	2.23	5.5	28.6	44.3	1.55	18.0
No earner present	1.23	5.0	19.7	29.9	1.52	19.9
High benefits	0.76	8.8	7.9	15.4	1.93	11.4
Single head, child under 6	1.86	5.7	24.5	38.6	1.58	17.4
Single head, child 6-18	1.45	5.5	20.9	32.6	1.56	18.1
Single head, elderly, no earner present	1.06	1.4	42.9	49.2	1.15	70.8

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

Table of Contents

TABLE III.6

ESTIMATED COEFFICIENTS OF A
MODEL OF TURNOVER IN FOOD STAMP
PARTICIPATION WITH A RANDOM DISTURBANCE

Independent Variable	Entry Model		Exit Model	
Constant	-5.333		-2.538	
Elderly/Disabled	.282	(1.59)*	-.768	(-3.51)***
Nonwhite	1.900	(12.97)***	-.443	(-2.56)***
Single head	.205	(1.23)*	-.518	(-1.99)**
Youngest child under 6	.984	(4.63)***	.020	(0.06)
Youngest child 6-18	.394	(1.90)**	.017	(0.05)
AFDC recipient	1.637	(3.47)***	(-.467)	(-1.83)**
Earner present	-1.458	(-8.38)***	1.028	(5.32)***
Single head, child present	1.096	(4.00)***	.459	(-1.29)*
Variance of error term	3.380		.117	
X_2	483.32***		127.90***	
Number of observations	7,276		667	

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

Note: Asymptotic t statistics are in parentheses.

* Significant at .10 level (one-tailed test).
** Significant at .05 level (one-tailed test).
*** Significant at .01 level (one-tailed test).

C. TURNOVER IN ELIGIBILITY FOR THE FOOD STAMP PROGRAM

In order to be eligible for food stamps, a household must have income and assets below certain defined eligibility limits.[1] Once a household is eligible, it can decide whether or not to participate in the program, whereas ineligible households (discounting, for expositional purposes, the possibility of fraud) do not have that choice. Turnover in participation must necessarily result from the combined effects of participation decisions among eligible households and from changes in eligibility resulting from changes in households' economic circumstances over time. The tabular results obtained in the current analysis do not make possible a rigorous test of what proportions of observed participation turnover result from each of these two contributing factors. However, eligibility for food stamps has been simulated by month for all households and the results of this simulation have been used to construct measures of turnover in eligibility that parallel those constructed for participation turnover. These measures provide illustrative evidence of the degree to which eligibility transitions underlie transitions in participation.

A number of factors make it difficult to combine the measurement of participation turnover with the simulation of eligibility turnover. First, the provisions of the Food Stamp Act of 1977 were being implemented throughout the first half of 1979. Elimination of the purchase requirement (EPR) was effective in January, 1979, but changes in the type and number of allowable deductions were phased in during the first six months of the year. Because the caseload was being converted to the new rules during

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[1] See Appendix B for the income and asset screens in effect for most of 1979.

this half-year, it is impossible to identify, for early 1979, which households in the sample were (or would have been) certified under the old rules and which under the new. In addition, simulation of the old rules, with a more extensive set of deductions, would have been quite difficult to do with the ISDP Panel data.

In order to use a consistent eligibility algorithm, it was decided to simulate eligibility under a single consistent set of program rules--the 1977 Act, with income screens, deductions, and benefit levels set at the July 1979 levels. While this eligibility simulation is very useful for measuring transitions in and out of eligibility (given constant eligibility rules) during the year, it is not possible to generate meaningful estimates of turnover in participation conditional on eligibility for the entire year.[1] This is because changes in participation in the first half of the year may be affected by changes in eligibility rules rather than just changes in households' economic circumstances and other behavioral factors. In summary, these eligibility transition rates, considered independently, provide useful and reliable indicators of changes in household circumstances underlying food stamp turnover. The eligibility

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[1]Since the data on food stamp participation by month are fairly reliable to begin with and furthermore have been edited for consistency over time, we felt it appropriate to use the full sample as the basis of estimates of turnover in participation. However, a supplemental calculation has been done, for only the restricted subsample for whom eligibility could be determined, of participation turnover among eligible households during the second half of 1979. These estimates, under alternative definitions of the timing of eligibility, are given in Appendix B. In general, the estimated entrance rate is higher, and the exit rate lower, when the calculations are based on only eligible households. The entrance rate for eligible households is over 2 percent in a typical month (compared to 0.5 percent for all households), and the exit rate for eligibles is about 4 percent (comapred to over 7 percent for all households).

estimates are also valid in comparisons across different types of households. However, these transition rates will consistently reflect actual program eligibility for only the second half of the year. In addition, they are based on a smaller sample than are the participation transition rates, since eligibilty could not be simulated for households with extensive missing income data.

1. Aggregate Estimates

The annual-monthly ratio for eligibility compares the number of households ever eligible for food stamps during a year with the number eligible in an average month. As shown in Table III.7 this ratio is 1.89 for the aggregate ever-eligible sample. The straightforward interpretation of this estimate is that the number of households expected to be eligible in at least one month of a given year is about 90 percent higher than the number eligible in a typical month. It is interesting that the annual-monthly eligibility ratio is higher than the annual-monthly participation ratio (of 1.74) even though the universe for the eligibility estimates is more restrictive in ways that might be expected to reduce turnover estimates. The intuitively appealing implication is that transitory eligibility is not completely reflected in transitory participation, perhaps due to households' ability to draw on other resources during short periods of financial need as well as to the fixed costs of food stamp participation--the time and stigma associated with applying and being certified for food stamp benefits.

The aggregate entrance and exit rates for eligibility are both much higher than the corresponding rates for participation. The estimated average monthly eligibility entrance rate of 6.3 percent (Table III.7)

Table of Contents

TABLE III.7

INDICATORS OF TURNOVER
IN FOOD STAMP PROGRAM ELIGIBILITY
BY SELECTED UNIT CHARACTERISTICS

	Annual/Monthly Eligibility Ratio	Eligibility Exit Rate	Eligibility Entrance Rate
All Households	1.89	17.26%	6.30%
AFDC Status			
Recipient	0.75	8.64	21.30
Nonrecipient	1.99	17.98	5.94
Other Welfare			
Recipient	1.06	11.52	12.20
Nonrecipient	1.86	17.17	5.65
Age of Head			
Under 25	2.65	23.58	6.22
25-44	2.12	21.77	5.63
45-59	1.89	16.92	5.56
60-64	1.61	14.60	5.81
65+	1.48	13.50	8.64
Family Status			
Married w/children	2.25	23.00	5.92
Single w/children	1.53	13.38	13.20
Married, no children	2.25	26.30	4.60
Single, no children	1.81	13.55	6.23
Race			
White	1.94	17.92	5.61
Nonwhite	1.86	15.03	9.26
Household Size			
1	1.65	11.76	6.25
2	2.25	23.16	5.49
3-4	2.23	20.82	5.89
5+	1.71	15.30	8.45
Children Under 19			
0	1.86	16.56	5.45
1	2.19	21.18	6.82
2+	1.80	16.67	7.03

continued

Table of Contents

TABLE III.7 (continued)

	Annual/Monthly Eligibility Ratio	Eligibility Exit Rate	Eligibility Entrance Rate
Children Under 6			
0	1.86	16.87	5.68
1	2.57	20.20	7.67
2+	1.67	14.59	7.35
Highest Grade Completed[2]			
Less than 9th	1.57	13.09	10.81
9th-11th	1.64	13.01	7.43
12th	2.16	20.87	5.37
Some college	2.58	27.73	4.32
Presence of Earners			
Present	2.40	26.92	4.94
Not Present	1.47	9.39	13.75
Elderly[3] or Disabled Persons			
Elderly	1.57	14.39	7.21
Disabled	1.54	10.07	11.32
Both	1.46	13.72	10.87
Neither	2.26	21.63	5.44

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel. (See text for details of particular calculations.)

[1]GA and/or Emergency Assistance.
[2]Head of household.
[3]60 or over.

implies that about six percent of all households ineligible for food stamps in a given month will become eligible the following month. Recall that the monthly entrance rate into participation, relative to the non-participant population, was only about half of one percent.

The estimated average monthly exit rate from eligibility is extremely high. 17.3 percent of households eligible for food stamps in a typical month become ineligible in the following month, although as seen earlier, only 7.3 percent of participants leave the program each month. Despite the difficulty of combining the separate eligibility and participation estimates, it is evident that transitions in eligibility are even more frequent than transitions in program participation.

2. Variation by Household Characteristics

Transition rates into and out of eligibility differ for different types of households. As can be seen from Table III.1 and Table III.7, differences in the annual-monthly participation ratio are generally mirrored by differences in annual-monthly ratios of eligibility; characteristics associated with low participation turnover are also associated with low rates of transition in eligibility. As noted above, the eligibility ratio is somewhat higher than the participation ratio, averaged across all households (1.89 vs. 1.74). For particular household characteristics associated with low turnover in participation, however, the estimated eligibility turnover measure is often lower than the participation turnover estimate. For example, households receiving welfare other than AFDC have very low annual-monthly participation ratios (1.34) and even lower annual-monthly eligibility ratios (1.06). For AFDC households, the eligibility ratio actually falls below one, an apparently-anomalous result

that is probably generated by their actual low turnover coupled with the way in which the AFDC classification is assigned over time.[1]

Exits from eligibility (Table III.7) show generally the same distributional patterns as do exits from participation. The lowest exit rate is 8.6 percent for AFDC households (compared to 18 percent for non-AFDC households) indicating that AFDC recipients are less than half as likely as nonrecipients to lose their food stamp eligbility in any given month. Elderly and disabled households, nonwhite households and single-parent households all have lower than average eligibility exit rates underlying their low rates of leaving the program.

The age distribution of eligibility exits is somewhat different from that of participation exits. The lowest rate is still associated with households heads aged 65 and over, but unlike participation exits, the rates are highest for the youngest households and decline rather smoothly with increasing age. Thus, for households headed by persons 25 and younger, the probability of becoming ineligible is higher than average (24 percent compared to the overall 17 percent) while the probability of leaving the program is slightly lower than average (7.1 percent compared to 7.3

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[1]The classification of households by type with respect to statistics reflecting behavior over time is not straightforward when a characteristic--such as AFDC recipiency--may itself change. As is discussed further in Appendix A, the construction of annual ever-eligible or ever-participant counts by unit characteristics requires some arbitrary rule for assignment of varying characteristics. For annual ever-eligibles, households are counted as AFDC recipients if they were so in the first month in which they appear eligible for food stamps. The average monthly eligibility count, however, is based on households' classification in each individual month. It is evidently the case that some households not receiving AFDC when first eligible for food stamps later do receive AFDC (and are still food stamp eligible) and thus are counted as AFDC households in later monthly counts.

percent.) Composition may offer an explanation for this result. The youngest group includes AFDC recipients who, once on the Food Stamp Program, are slow to leave. It also includes young adults who leave their low-income state as they become employed, resulting in high eligibility exit rates.

As with participation exits, the highest rates of exit from eligibility are associated with the presence of earners, higher educational attainment and two-parent families.

Rates of entrance into eligibility, also shown in Table III.7, express the probability that a household of a given type will become eligible for food stamps in any given month. As in the aggregate rates discussed earlier, eligibility entrance rates are generally higher than participation entrance rates, for any given household type. Broadly speaking, most types of households become eligible for food stamps more frequently than they begin participating in the program. In almost all cases, household characteristics associated with high rates of program entry are also associated with underlying high rates of eligibility entry--AFDC households who have among the highest rates of program entry, also have the highest eligibility entrance rate--21.3 percent or more than three times the average. A household receiving AFDC (but not food stamps) has a one-in-five chance of entering the Food Stamp Program in an average month.

The RATE model has also been used to analyze transitions into and out of food stamp eligibility, in particular to identify household characteristics that have an independent effect on eligibility transitions.

Table III.8 presents the results of estimating the RATE model on data on transitions to and from eligible status.[1] The principal conclusions to be drawn from our analysis are:

- Households with elderly and disabled persons, household that receive AFDC benefits, and nonwhite households are most likely to enter eligible status than other households, ceteris paribus.

- Although households with one head and households with children are not more likely to enter the program than other households, other things being equal, households in which both of these conditions exist are more likely to enter eligible status.

- A number of factors are associated with significantly lower rates of exiting from food stamp eligibility. They include the presence of an elderly or disabled person, being nonwhite, having a single head, and receiving AFDC. On the other hand, eligible households that contain an employed person are far more likely to exit from eligibility in a given month than otherwise similar households without an earner.

These findings are broadly consistent with the results of the tabular analysis presented above.

Table III.9 presents measures of turnover such as entry and exit rates, annual/monthly ratios, and predicted duration of eligibility for various hypothetical households.[2] This table shows that turnover in eligibility, as measured by such indicators as the ratio of annual to monthly eligibility and the expected duration of eligibility, is higher

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[1]The variable that measures the ratio of benefits to the poverty line is omitted from the model of entry into eligibility in Table III.18, because the value of this variable is zero by definition for all households that are initially ineligible for food stamps.

[2]See the discussion of Table III.3 above for the assumptions underlying this table.

Table of Contents

TABLE III.8

ESTIMATED COEFFICIENTS OF A
MODEL OF TURNOVER IN
FOOD STAMP ELIGIBILITY

Independent Variable	Entry Model		Exit Model	
Constant	-3.829		-2.343	
Elderly/Disabled	.331	(2.79)***	-.228	(-2.55)**
Nonwhite	4.57	(4.00)***	.480	(-5.96)***
Single head	.098	(0.80)	-.451	(-5.24)***
Youngest child under 6	.160	(1.39)*	-.008	(-0.07)
Youngest child 6-18	.064	(-0.53)**	.231	(1.96)**
AFDC recipient	1.281	(3.94)***	-.650	(-3.27)***
Earner present	.092	(0.54)	.739	(9.05)***
Single head, child present	.430	(2.08)**	.025	(0.18)
Benefit/poverty line ratio			-1.220	(-3.33)***
X^2	59.42***		112.76***	
Number of observations	1,959		1,850	

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

Note: Asymptotic t statistics are in parentheses.

* Significant at .10 level (one-tailed test).
** Significant at .05 level (one-tailed test).
*** Significant at .01 level (one-tailed test).

TABLE III.9

PREDICTED MEASURES OF
TURNOVER IN ELIGIBILITY

Household Type	P(Entry)	P(Exit)	Monthly Participation Rate	Annual Participation Rate	Annual/ Monthly Ratio	Predicted Duration
Baseline	2.2	14.4	13.1	31.8	2.42	6.9
Elderly/disabled	3.1	11.6	20.9	43.9	2.10	8.6
Nonwhite	3.5	9.1	27.9	51.4	1.84	11.0
Single head	2.5	9.4	20.8	39.8	1.92	10.6
Youngest child under 6	2.6	14.3	15.2	36.2	2.38	7.0
Youngest child 6-18	2.0	17.8	10.1	28.1	2.77	5.6
AFDC recipient	7.9	7.6	51.1	80.2	1.57	13.2
No earner present	2.1	7.2	22.4	38.4	1.71	13.9
Single head, child under 6	2.2	11.5	16.2	34.5	2.13	8.7
Single head, child 6-18	3.0	9.5	24.0	45.7	1.91	10.5
Single head, elderly, no earner present	2.4	12.0	16.6	36.0	2.17	8.3
	3.2	3.7	46.7	62.8	1.35	27.2

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

than turnover in participation (see Table III.3 for comparison).[1] Again, this conclusion is consistent with the conclusion implied by the tabular results earlier in this chapter.

It is rather interesting that the generosity of food stamp benefits appear to reduce the rate at which eligible households become ineligible, ceteris paribus. One possible hypothesis that could explain this finding is that the Food Stamp Program contains incentives to reduce labor supply, and thus prolong the period during which a household's income falls short of the criteria for becoming ineligible.

Another possible explanation for this finding that it reflects the fact that the households that qualify for the highest benefits are, by definition, those that are farthest away from becoming ineligible (more specifically, income-ineligible). These households would have to experience relatively large increases in income before they become ineligible. It is difficult, if not impossible, to disentangle these two factors in our analysis; hence, this should be considered a topic for future research.

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[1]Recall that low duration is an indicator of high turnover.

IV. CONCLUSIONS

In general, our findings imply higher levels of turnover than the findings of earlier studies based on data bases that are more limited in scope, especially data from income maintenance experiments. Although there may be a number of explanations for this divergence, one appealing explanation is that members of income maintenance experiments samples are atypical, in particular, in order to be selected for participation in the experiment, as either an experimental household or a control household, a household had to have a very low level of permanent income. As we have seen, households that are likely to have low permanent income (e.g., those whose head has little formal schooling) also tend to exhibit low food stamp turnover levels.

In addition, the levels of food stamp turnover that we have found tend to be higher than observed turnover levels in other income maintenance programs, most notably AFDC.[1] This is not surprising, given that the absence of categorical restrictions in the Food Stamp Program makes it available to alleviate relatively transitory economic difficulties, compared to the conditions that give rise to AFDC eligibility and participation. Also, our findings with respect to the interrelationships among participation in various income maintenance programs are broadly consistent with those of other researchers.

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[1] For instance, see Plotnick (1983).

Table of Contents

REFERENCES

Bane, Mary Jo, and Ellwood, David T. The Dynamics of Dependence: The Routes to Self-Sufficiency. Urban Systems Research and Engineering, Inc. Report to the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services, June 1983.

Boskin, Michael J., and Nold, Frederick C. "A Markov Model of Turnover in Aid to Families with Dependent Children." Journal of Human Resources, 10, No. 4 (1975).

Carr, Timothy J. "Estimating the Probability of Re-Employment: An Application to a Sample of Unemployment Insurance Exhaustees." Paper presented at the Summer 1980 meeting of Econometric Society, Denver, September 1980.

Carr, Timothy J., and Marilyn E. Manser. Turnover in Food Stamp Participation--A Preliminary Aanlysis. Mathematica Policy Research report submitted to the U.S. Food and Nutrition Service, November 30, 1982.

Chiang, Chin Long. An Introduction to Stochastic Processes and Their Applications. Huntington, N.Y.: Krieger, 1980.

Coe, Richard D. "Participation in the Food Stamp Program, 1976." In Five Thousand American Families--Patterns of Economic Progress, Vol. VII, edited by Greg J. Duncan and James N. Morgan. Ann Arbor: Institute for Social Research, 1979.

Czajka, John L. Determinants of Participation in the Food Stamp Program: Spring 1979. Mathematica Policy Research, Draft Final Report submitted to the Food and Nutrition Service, U.S. Department of Agriculture, November 5, 1981.

Dicker, Marvin, and Casady, Robert J. "A Reciprocal Rule Model for a Longitudinal Family Unit." Paper presented at the 42nd Annual Meeting of the American Statistical Association, Cincinnati, August 1982.

Doyle, Pat, and Citro, Constance F. The ISDP/RAMIS II System and Its Development. Mathematica Policy Research, Final Report to the U.S. Department of Agriculture, Food and Nutrition Service, May 1984.

Doyle, Pat, and Constance F. Citro. Proposed Design Strategy for Storing and Accessing Data from the 1979 Income Survey Development Program Research Panel. Mathematica Policy Research Report submitted to the Food and Nutrition Service, U.S. Department of Agriculture, May 26, 1982.

Hutchens, Robert M. "Entry and Exit Transitions in a Government Transfer Program: The Case of Aid to Families with Dependent Children." Journal of Human Resources 16, No. 2 (1981).

Kaitz, Hyman B. "Analyzing the Length of Spells of Unemployment." Monthly Labor Review 93, no. 11 (November 1970), pp. 11-20.

Kaluzny, Richard, et al. Analysis of Quarterly Income Profiles. Mathematica Policy Research, ISDP Center on Income, Report submitted to the Department of Health and Human Services, September 1981.

Lancaster, Tony. "Econometric Methods for the Duration of Unemployment." Econometrica 47, No. 4 (July 1979): 939-956.

Lubitz, Irene Smith, and J. Richard Whitmore. Issues of Food Stamp Unit Definition: Evidence from SIPP. Mathematica Policy Research, Draft Final Report submitted to the Food and Nutrition Service, U.S. Department of Agriculture, July 1982.

MacDonald, Maurice. Food Stamps, and Income Maintenance. New York: Academic Press, 1977.

Mathematica Policy Research, Inc. Longitudinal Analysis Files Created in Support of a Study on Turnover in the Food Stamp Program. Draft Record Format Description submitted to the Food and Nutrition Service, U.S. Department of Agriculture, April 5, 1983.

Maxfield, Myles Jr. "Participation in the AFDC and Food Stamp Programs." Mathematica Policy Research Discussion Paper 7287. Washington, D.C., 1979.

Merck, Carolyn L. "Turnover and Recidivism in the Food Stamp and Aid to Families with Dependent Children Program." Staff Paper No. 7286-003. Washington: Mathematica Policy Research, January 1980.

Pearl, R.B.; Frankel, M.; and Williams, R. Effect of Missing Information on Reliability of Net Worth Data from the 1979 ISDP Research Panel. Urbana, Ill.: Survey Research Laboratory, University of Illinois, May 1982.

Plotnick, Robert. "Turnover in the AFDC Population: An Event History Analysis." The Journal of Human Resources 18, no. 1 (Winter, 1983).

Salant, Stephen W. "Search Theory and Duration Data: A Theory of Sorts." Quarterly Journal of Economics 91, no. 1 (February 1977), pp. 39-57.

Springs, Ricardo C. Food Stamp Participation Patterns in Seattle Washington-1971. Mathematica Policy Research, Discussion Paper 7287-08. Sept. 6, 1977b.

Tuma, Nancy Brandon, "Invoking RATE." Mimeographed, January 29, 1980.

Tuma, Nancy Brandon; Hannan, Michael T.; and Groeneveld, Lyle P. "Dynamic Analysis of Event Histories." American Journal of Sociology 84, no. 4 (January 1979), pp. 820-854.

U.S. Department of Agriculture, Food and Nutrition Service. Effects of the 1977 Food Stamp Act. Second Annual Report to the Congress, January 1981.

U.S. Department of Agriculture, Food and Nutrition Service, Accounting and Reporting Division. Food Stamp Program Statistical Summary of Operations. January-December 1979.

APPENDIX A

DATA BASE DESIGN ISSUES

In this appendix we outline our approach to resolving three methodological issues that need to be addressed in a longitudinal study of this nature:

- o The definition of the basic unit of analysis (i.e., household) over time.
- o The choice of appropriate sampling weights.
- o Treatment of incomplete data.

A. LONGITUDINAL HOUSEHOLD DEFINITIONS

Any analysis of turnover in the Food Stamp program clearly requires that decisions be made as to whether a unit that is observed at a given point in time is the "same" unit as one that is observed at a different point in time. The answer to this question is not always straightforward when the composition of units changes. In this section we discuss the manner in which we dealt with cases of altered unit composition over time.

1. Unit Definition Typologies

In a recent paper, Dicker and Casady (1982) addressed problems in defining longitudinal family units, reviewed existing methodologies for longitudinal analysis of families, and proposed a new, "reciprocal rule model" to be applied to the National Medical Care Utilization and Expenditure Survey (NMCUES). Although their focus was on families, the approaches could also be applied to households.

The four existing methodologies reviewed by Dicker and Casady were the following: the cohort model, the dynamic cohort model, infinite

extended family models, and the key element model. In the cohort model, the family is treated as continuous only if there are no changes in the originally-sampled membership of the unit. If a change of any sort does occur, the unit is simply eliminated from the sample for the remainder of the study period; thus, no change in family structure is measured by the approach. In the dynamic cohort model, any change in composition results in "death" of an old family and "birth" of a new family, thereby, in the view of those authors, yielding an overestimate of the amount of change. (In any case, the estimate of the amount of change is an upper bound on the other methods.) In infinite extended family models, all persons who were part of the original sample of families at time zero are included in the sample for the duration of the study, no matter in what combinations of persons they form. In the key element model, the analyst designates a "key element," which can be either a person (i.e., family head) or a set of persons (i.e., head and spouse); whoever is associated with the key element at any given time during the study is in the family at that point, and all others are outside it. By stringing together the series of these families linked by the key element, a longitudinal family is defined. Dicker and Casady (p. 8) argue that: "It is hard to justify following the single household or ending the family where there are four other persons of the original family remaining." They also note that there is a sex bias in using family heads as the key element because they are usually male.

Dicker and Casady's reciprocal rule methodology says that whatever rules are used to define families longitudinally, the rules must be applied reciprocally. In the NMCUES model, a family defined as the principal successor family must contain more than half of the members of the family

of which they were a part just prior to the change; principal predecessor families are defined analogously. All situations in which a family splits evenly are treated as deaths, and similarly for equal mergers. We would argue that this MMCUES approach, like the key element approach which Dicker and Casady criticize, is unacceptable because of the bias produced: here, female-headed families would nearly always be followed rather than a single male head following a split.

2. Approaches Taken in Previous Studies of Turnover

Previous studies of turnover in income maintenance programs such as Food Stamps and AFDC have been relatively few in number. Some, such as Merck (1980), employ what Dicker and Casady would characterize as the dynamic cohort approach (i.e., any change indicates the end of an old unit), which appears unduly restrictive. Others, such as Plotnick (1983), utilize what amounts to a person-level analysis in the typology of Kasprzyk and Kalton (1982), in that a particular person (i.e., a female head of household) is followed through time. Although this approach may be appropriate for the analysis of programs such as AFDC in which the provision of benefits is closely linked to a given person (e.g., the mother), it seems less appropriate here, given that, for instance, a household or food unit can be split up and create two or more units, all of which are potentially eligible for benefits, regardless of sex, parenthood status, etc.

3. Approach Used in the Current Study

The approach we have adopted shares certain ideas with both the key element approach and the MMCUES approach, but does not share the

previously-noted limitations. The definition of family structure that we have used, in our view, has major advantages over each of these other approaches. In our approach, we first define the concept of a principal person of a unit. The unit reference person and his/her spouse, if any, are considered to be the principal persons of that unit. The definition of a unit over time is determined by the status of the principal persons. Specifically, we have followed these rules:

1. If the identity of the principal person(s) of two units observed in consecutive months are the same, then they are considered to be the same unit.

2. If one of the two principal persons in a unit in one period is no longer a member of the ISDP panel in a subsequent period (because of death, attrition, etc.), the unit containing the other principal person is considered to be the continuation of the original unit provided that the remaining person continues to be a principal person in his/her unit. Otherwise, the unit is considered to have dissolved.

3. If a unit that contains one principal person in a given period acquires a second principal person (e.g., through marriage) in a subsequent period, then that unit is considered a continuation of the original unit.

4. If a unit has two principal persons in a given period, and if these two persons split into separate units of which each is a principal person between consecutive periods, then one of the two resulting units drawn at random, will be considered a continuation of the original unit; the other unit will be considered a newly formed unit.

5. If a unit initially has a single person, acquires a second principal person in a subsequent period, and then splits into two units, in a yet later period, the unit containing the original person will be considered a continuation of the unit, rule (4) notwithstanding.

This approach clearly has the advantage of enabling us to examine the impact of changes in household structure on food stamp participation for a

random sample of longitudinal household types. For a broader view of the turnover issue, we would also recommend investigating the effects of the NMCUES approach of always following the successor unit with the greatest number of original household members (to provide a lower estimate of household status change than our approach). This could be done by reweighting rather than by constructing alternative longitudinal household extracts.

To illustrate how we constructed longitudinal units for purposes of this study, suppose our data base contained a household such as that displayed in Figure A.1. During month 1, this is a typical four-person household with parents and two children. By month 4 the oldest child, Sue, has moved out to form a new household with a friend. In month 10, the husband, Harry, and his wife, Alice, separated. Alice then leaves home with the youngest child, John. By month 14, Alice has decided to move to her mother's house rather than continue living alone with her son. Figure A.2 displays the longitudinal units which would be found with this group. The first unit starts out as the original household. In month 4, only the daughter, Sue, moves out. This does not trigger the dissolution of Unit 1 because Sue is not a principal person. However, we have 2 units as of month 4 because Sue has formed a household of her own where she is the principal person. In month 10, Harry and Alice separate. At this point a random draw occurs because both Harry and Alice are principal persons. Harry wins in this case so Unit 1 continues with only one of the original members. Unit 3 now begins with Alice and the son, John. Note that had Alice won the toss, Unit 1 would have still continued but it would have consisted of two of the original four members, Alice and John. Finally in

Table of Contents

FIGURE A-1

COMPOSITION CHANGES FOR A
HYPOTHETICAL GROUP ON THE ISDP

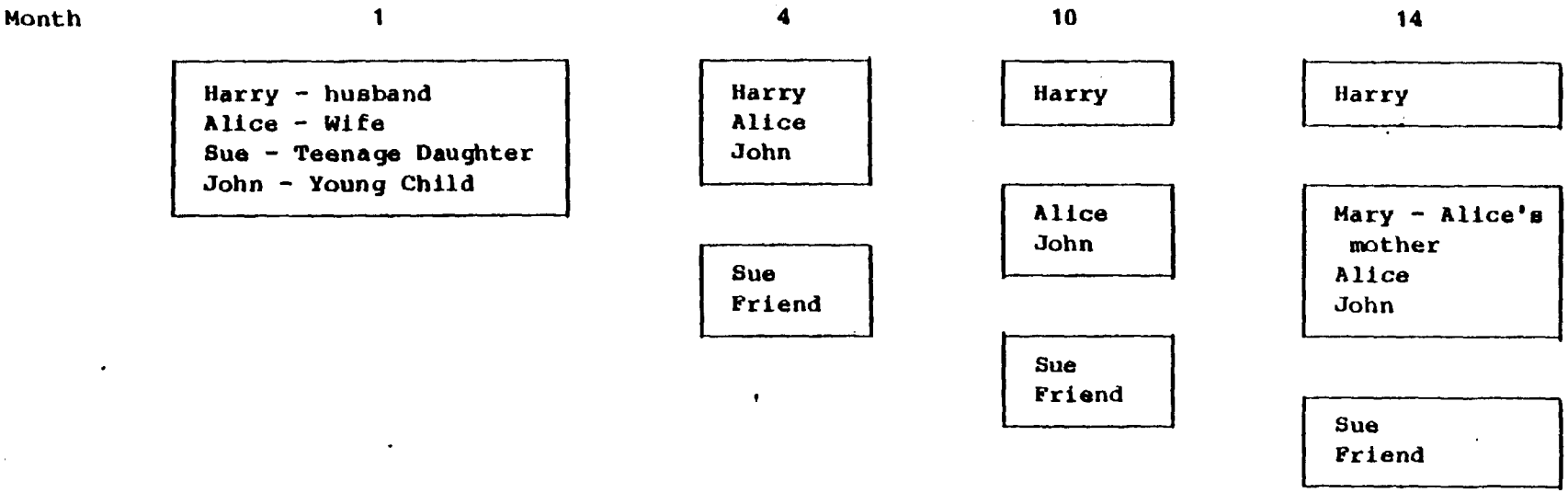

FIGURE A-2

LONGITUDINAL UNIT FOR THE
HYPOTHETICAL GROUP

Month	1	4	10	14
Unit #1	Harry Alice Sue John	Harry Alice John	Harry	Harry
Unit #2		Sue Friend	Sue Friend	Sue Friend
Unit #3			Alice John	
Unit #4				Mary Alice John

month 14, units 1 and 2 continued as described above. However, when Alice moves in with her mother, she ceases to be a principal person, so Unit 3 dissolves. Unit 4, which consists of the mother and daughter and grandchild is now formed.

B. SAMPLING WEIGHTS

There are two sets of sample weights available in the ISDP files. Both of these were prepared cross sectionally, that is, they were prepared for each wave individually in the same way that weights would be constructed for a single cross section survey of the population. The first of these two weights is essentially the inverse of the sampling ratio adjusted for household nonresponse. The second of these two weights reflects the outcome of the ratio adjustment procedure designed to ensure that the weighted population figures from each wave are representative of the U.S. population.

As implied by the preceding paragraph, there are no longitudinal weights available on this data base. That is, there are no weights available which when applied to counts of longitudinal units in the turnover study file, produces an estimate of the total number of households that ever existed in the U.S. during 1979. Use of unweighted data as a basis for the analysis of turnover in the program would result in biased estimates because of the complexity of the survey design. Hence, for purposes of producing tabular data, relative population weights were used. For each unit, the relative weight was set equal to the value of the unbiased Wave I weight of the head. The unbiased weight was the first of the two weights discussed above. In order to use these weights in this fashion the universe for the study was restricted to longitudinal units

headed by primary sample members, that is, individuals interviewed in Wave I. The survey design was based on the concept that all such individuals would be followed for the life of the survey and that other people would only be included if they resided with a primary sample member at the time of one of the interviews. Therefore, restricting the universe in this fashion did not bias the results except by excluding newly formed units headed by secondary sample members.

The implication of the use of relative weights in this study is only that national caseload counts cannot be presented because ratio adjustment factors to achieve controls are not included in these weights. It does not prohibit the presentation of distributions of caseload and benefits, nor does it prevent the comparison of monthly figures across months or with counts of annual caseload.

C. TREATMENT OF INCOMPLETE DATA

The ISDP data upon which this study was built were subject to nonresponse, as is true of any survey. The types of nonresponse which occurred include the following:

- Units in the original design were not interviewed in Wave I (some were subsequently included; others were simply omitted from the sample).
- Household units were missing one or more waves.
- Individual sample members were missing one or more waves.
- Item nonresponse in all waves, for example, some individuals consistently refused to answer one or more questions during all of the interviews.
- Item nonresponse in selected waves, that is, individuals responded to a question in some but not all waves.

These types of nonresponse were dealt with in different ways. The exclusion of some units in Wave I was overcome by the restriction of the universe to units headed by individuals interviewed in Wave I. The unbiased Wave I weights used in the analysis were adjusted for this type of nonresponse so no bias was introduced as a result. In the participation tables, the second and third types of nonresponse were handled by creating a separate classification for those units for whom we did not have data in one or more waves. In the case of eligibility, however, we chose to restrict the universe so as to exclude units disappearing because one or more waves of data were missing. The impact of the restriction of the universe in this fashion can be seen through the examination of the figures in Table A-1. In this table, the distribution of total households and food stamp eligible households by type of longitudinal unit are presented. For eligible units, that is, households eligible at least one month during the year, 83 percent were intact households for the full 12 months. 7 percent represented units formed subsequent to the beginning of the year but which remained intact for the remainder of the period and 2 percent were units who dissolved as the result of either death of the principal person or the principal person becoming a dependent in another unit. The remaining 9 percent are those units excluded from the universe. They represented situations where the unit appeared to have dissolved simply because one or more waves of data were not collected. If they were included in the analysis of turnover, they would artificially inflate the turnover rate as at least some do not truly become ineligible. We simply had no data with which to determine eligibility for the missing waves. Examination of the distribution for total households implied that the pattern of wave

Table A.1

Distribution of Total Households and Households Eligible for Food Stamps by Type of Longitudinal Unit

	Households Eligible for Food Stamps 1979	Total Households 1979
Intact Households	82.58%	83.84%
Units Formed After January	6.52%	5.98%
Units Disappearing through Natural Attrition	1.64%	1.16%
Units Disappearing through Artificial Attrition	9.27%	10.05%

SOURCE: Calculated by Mathematica Policy Research from the ISDP 1979 Panel.

NOTE: The universe for these tables was restricted to households with at most some nonresponse on income items.

nonresponse is not significantly different for food stamp units than for the total population.

Regarding item nonresponse, the impact on the turnover study varied depending on the nature of the missing data. Some information had been edited longitudinally both by the Census Bureau and MPR.[1] The longitudinal edits performed by the Census Bureau were confined to basic demographic data such as age and sex. MPR edited items relating to monthly household and food stamp unit composition longitudinally. Consistency edits on reported food stamp benefits were also carried out longitudinally by MPR, however, benefits were not imputed to units reporting receipt but for whom no amount was recorded. The Census Bureau had performed consistency edits within wave on the responses to food stamp recipiency.

In discussing the treatment of nonresponse on other items it is useful to first review the nature of the items which were relevant to this study. Unit composition, basic demographics, and food stamp participation were of course paramount to this study and the treatment of nonresponse was discussed above. Other data pertinent to the study were the components of the elgibility determination and the unit characteristics which are presented in the tabular analysis and used as independent variables in the econometric model. The components of the eligibility determination are income, assets, deductions and household composition. Each is discussed in turn.

The questionnaire design was such that income data were gathered in two steps. First, a series of questions was asked designed to elicit

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[1]Refer to Doyle and Citro (1984) for a discussion of the longitudinal editing.

information on recipiency. Second, for individuals responding positively to recipiency, amounts were queried. The recipiency items on the data base used in the turnover study had been edited for consistency within wave by the Census Bureau. No further longitudinal edits were performed. The Bureau also performed cross sectional imputations in cases where recipiency was known but amounts were not reported. The imputation technique was considered inappropriate for longitudinal analysis and hence the results were not used.

With regard to assets, extensive questions on asset values were included in the supplemental part of the Wave V interview. Furthermore, imputations were performed on these items by the University of Illinois (Pearl, et al, 1982). However, these data were not obtainable in sufficient time to permit inclusion in this analysis. Hence, a proxy for asset value was determined using reported asset income. The nature of the asset income questions was like that of the other income questions discussed above.

Deduction information was collected primarily in Wave II although data on shelter costs were collected in Wave IV. The information was gathered as part of the supplemental section of the questionnaire and no edits were performed on these data either for consistency or for nonresponse.

In designing the aspect of this study which relied directly on eligibility, MPR reviewed the extent to which nonresponse patterns affected the study of turnover and the potential bias which could be introduced if observations with nonresponse or selected items were omitted. The option of performing longitudinal imputations was not part of the scope of this

task. Furthermore, resources did not permit reweighting the sample in the event that exclusion of cases of nonresponse significantly biased the results.

In order to evaluate the impact of the response problem, the impact on turnover in eligibility was measured by comparing estimates using three different universes. These were constructed on the basis of response patterns as described below:

(1) Units with nonresponse on at least one income or asset amount variable and units for whom no deduction information was obtainable from Wave II (i.e. no Wave II interview was conducted) and units with nonresponse on dependent care expense amounts were entirely excluded.

(2) Units with extensive nonresponse on income or asset amount variables and units for whom no deduction information was obtainable and units with nonresponse on dependent care expenses amounts were excluded. Excessive nonresponse was defined as more than half of the income sources reported by unit members had no amounts recorded and more than one quarter of the asset income sources reported by unit members had no amount reported.

(3) All units were included regardless of the nonresponse pattern.

Estimates of turnover in eligibility for each of these three universes are presented in Table A.2. The first column shows turnover in eligibility to be 2.2 when measured relative to an average monthly figure with extreme estimates ranging from 1.6 to 2.7. These figures were based on eligible households where non-reported income amounts and deduction amounts were assumed to be zero. Clearly this assumption overstates the absolute counts of eligibles since occurrences of negative income are fairly rare and are often considered to be an indication of wealth. However, this assumption

Table of Contents

TABLE A.2

COMPARISON OF RATES OF TURNOVER IN ELIGIBILITY OVER VARIOUS UNIVERSES

	Total Households	Households With no Non response	Households with at most some Non response[1]	Households With at Most Some Nonresponse With No Artificial Attrition
Annual Ever Eligibles	2.184	1.903	1.953	1.888
Average Monthly Caseload	1.000	1.000	1.000	1.000
Maximum Monthly Caseload	1.380 (Jan)	1.256 (Jan)	1.315 (Jan)	1.272 (Jan)
Minimum Monthly Caseload	.810 (Oct)	.753 (Oct)	.743 (Oct)	.770 (Oct)
Turnover				
Relative to Average	2.184	1.903	1.953	1.888
Relative to Maximum	1.582	1.515	1.485	1.484
Relative to Minumum	2.697	2.529	2.630	2.452

SOURCE: Tabulations of the ISDP/RAMIS II data base prepared by MPR.

NOTE: For each universe, all numbers are expressed as proportions of the averaged monthly caseload.

[1]At most some nonresponse includes households for which no more than 50% of the reported income sources were undercounted due to nonresponse, no more than 25% of the assets income sources were undercounted due to nonresponse and for which deductible expenses were obtainable.

also overstates turnover in eligibility because of intermittent non-response. For example, a unit could have reported earnings in excess of the maximum countable income during Waves I and III but had non-response in Wave II. Assuming no other income was reported, this unit would appear to be entering and leaving eligibility for a few months during the year.

In column 2 of table A.2, the other extreme is presented. In this column turnover in eligibility was estimated to be about 1.9, lower than the column 1 estimate. The universe for this column was restricted to only households for which all data were properly reported. Conversely to the previous estimate this would tend to understate turnover as nonresponse is a problem which can occur when small amounts of income were received as well as when large amounts of income were received.

Column 3 presents a middle-of-the-road estimate of turnover in eligibility. Here we have eliminated cases where non-response was substantial rather than eliminating all cases of non-response. The rate itself is 2.0, falling between the two previous figures. It is interesting to note though that when the rates are observed relative to the maximum monthly number of eligibles, column 3 estimates are lower than column 1 and 2.

In considering the potential bias introduced into the estimation of food stamp eligibility using the two extreme assumptions and considering that the actual rate itself did not fluctuate widely across the three universes, we elected to restrict our analysis to units with at most some non-response. In addition we chose to further restrict the universe to eliminate units who disappeared through artificial attrition. As discussed previously in this section, these units tend to bias the estimates upward. Column 4 of Table A.2 contains the results of the combined universe

restriction, as employed in the analysis presented in Chapter III. As one might expect, the annual-monthly ratio dropped to 1.9 overall.

In light of the decision to restrict the data upon which eligibility rates were calculated, we decided to examine the potential effect of such restriction on estimates of turnover in participation. Table A.3 shows the estimate dropping from 1.7 to 1.6 with the screens imposed.

TABLE A.3

COMPARISON OF RATES OF TURNOVER IN PARTICIPATION
ACROSS THE MOST AND LEAST RESTRICTIVE UNIVERSE

	All Households	Households with at most some non-response and with no attrition[1]
Annual Caseload	1.741	1.557
Average Monthly Caseload	1.000	1.000
Maximum Monthly Caseload	1.053 (March)	1.093 (Nov)
Mimimum Monthly Caseload	.954 (July)	.944 (Aug)
Turnover Rates		
Relative to Average Month	1.741	1.557
Relative to Maximum Month	1.653	1.425
Relative to Minimum Month	1.825	1.649

SOURCE: Tabulations of the ISDP/RAMIS II system prepared by MPR.

NOTE: For each universe, all figures are expressed as proportion of average monthly caseload.

[1]At most some nonresponse includes households for which no more than 50% of the reported income sources were undercounted due to nonresponse, no nonresponse and for which deductible expenses were obtainable.

APPENDIX B

ELIGIBILITY SIMULATION

Approach

Eligibility for the Food Stamp Program has been simulated for all households in the analysis file. The approach used compares estimated net income and assets of the sample households with a set of program parameters to assign monthly eligibility status and a monthly simulated bonus amount to each unit. This approach follows closely that used by MacDonald (1981) and Czajka (1981), in studies using early waves of the ISDP panel.

The ISDP has many advantages with respect to eligibility simulation. The questionnaire design is intended to obtain reliable, comprehensive information on a wide variety of detailed types of income and assets. In addition, some questions specifically oriented toward Food Stamp Program eligibility are included. In comparison with the Current Population Survey, for example, the ISDP contains many more variables required for eligibility simulation.

There are some disadvantages to the 1979 ISDP panel data as well. Although the number of items of interest is greater and the direct response rate on individual items is thought to be better than with the CPS, the files currently available from the Bureau of the Census do not have appropriate imputations for nonresponse on income amounts. The data files used in this analysis have more missing data than, for example, a CPS file would have (the CPS having more nonresponse initially but with complete imputation for missing items). The implications of this item nonresponse are discussed further below.

Methodological and Practical Issues

Three major issues arose in designing the eligibility simulation. One was the fact that the data used include a period during which the Food Stamp Program rules and regulations were in a state of transition, as the changes incorporated in the 1977 Act were phased in. The second problem generally stated, was nonresponse, including the item nonresponse mentioned above, as well as the absence of expenditure amounts for important components of the excess shelter deduction. The third general issue to be resolved was that of integrating monthly data (such as income) with data reported less frequently (such as certain expenditure items). These issues and their resolution are discussed in turn below.

Changes in Program Rules. The period for the tabular analysis of turnover is calendar year 1979, and the multivariate analysis includes up to 3 additional months for some households. The Food Stamp Act of 1977 (PL 95-113) went into effect in early 1979. Elimination of the purchase requirement (EPR) became effective in January, and changes in the type and number of allowable deductions were phased in during the first six months of 1979. States were to begin certifying all new recipients under the new rules by March 1, and to recertify their ongoing caseloads under the new rules by June 30, 1979. Changes in the asset limit and the addition of a medical deduction provided by subsequent amendments to the Act went into effect in January 1980.

The option of simulating the program rules prior to the 1977 Act posed several problems. First, it would be very difficult to simulate the larger set of deductions available under the older program--items such as hardship expenses, educational expenses, and taxes. Second, even if a

reliable simulation of earlier rules were applied, it would be virtually impossible to tell which households were (or would have been) certified under which set of program rules during the phase-in period. Because of these difficulties and in order to have a consistent and logical eligibility algorithm, it was decided to simulate eligibility under a single consistent set of program rules and parameters. The program rules used are accordingly chosen to be those in the 1977 Act, and the levels of indexed parameters such as income screen, the thrifty food plan, and deductions were selected to be those in effect in July 1979.

Defining one consistent eligibility algorithm has some advantages for the analysis at hand. Most important, it facilitates an examination of turnover in eligibility apart from changes in the program. The eligibility changes of interest are those that arise from changes over time in individual household circumstances, and this approach generates useful measures of turnover in eligibility. Using one set of rules, a ratio of annual eligibility to monthly eligibility is a valid indicator of such turnover, for example. However, the special problems posed by the 1979 analysis period remain with respect to participation estimates and particularly with respect to combining participation and eligibility estimates. As an example, we cannot generate useful estimates of month-to-month changes in conditional participation rates (defined as participants divided by eligibles) for periods of program change. The number of participants during such periods changes in part because of changes in the program, while simulated changes in eligibility cannot incorporate these changes in program

rules. However, we can examine changes in eligibility independent of participation, as well as differences in eligibility turnover across selected population subgroups.

Nonresponse. The lack of imputations for missing data items is problematic for eligibility simulation. As discussed in Appendix A, a significant number of sample households in our analysis file have extensive nonresponse on income amounts and expenditure items used in the eligibility simulation.

Development of appropriate longitudinal methodologies for this type of missing data is outside the scope of the current work. The problem is much more complex than cross-section nonresponse, since a method is needed for imputing not only monthly amounts but month-to-month changes in amounts as well. Furthermore, the approach should be designed so that reported data in one wave is used to impute missing data in other waves.

The options for dealing with item nonresponse are reviewed in Appendix A. As noted there, a compromise decision was reached regarding the eligibility analysis. For tables and models dealing with simulated eligibility, the sample was restricted to units with good to moderate item response and further to units that did not attrite from the sample. The file was not reweighted after imposing this screen. As noted in Appendix A, the imposition of these restrictions resulted in lower estimates of turnover in eligibility. Units with "some" nonresponse remain in the sample and are assigned zero for missing amounts.

Assigning a zero value for missing income does ceteris paribus make units with income nonresponse more likely to be simulated eligible. If, for example, units with higher actual income levels have a greater

likelihood of nonresponse on income items, this approach clearly distorts the distribution of simulated eligibles. The absence of appropriate alternatives points up the critical need for reliable longitudinal imputations on the ISDP files. Suppose, for example, a non-zero "average" value were assigned for all months of missing income items. If this average were based on the entire sample of (reporting) households, it would likely have the effect of making most if not all non-reporting households ineligible for food stamps. It may be argued that imputing any set of simple average amounts for all nonresponse cases would be equivalent to imputing eligibility status, with no underlying design incorporating true probabilities of eligibility.

Within the scope of the current analysis, therefore, it has been decided to use an unrestricted universe for analysis of participation and the restricted sample for eligibility estimates. We have therefore not combined these estimates and do not present participation rates conditional on eligibility, for example.

A subset of the nonresponse problem has to do with shelter cost amounts required for estimating the excess shelter deduction. The concatenated file from the Census Bureau, from which the turnover analysis files were created, had in some cases less information than the original questionnaire image files or the Wave 2 cross section files used in earlier FNS analysis. In particular, amounts paid by households for utilities were obtained in the survey and were retained on earlier cross-section files. In producing the multi-wave concatenated file, the Census Bureau removed

these amounts from household records.[1] However, a "payments flag" is available on the current file indicates what types of utilities payments are made by each household. These flags, on the Wave 2 records, indicate whether or not a payment was made for any of several tax and utility items. (These are documented in the next section.)

The excess shelter cost deduction is an important determinant of net income and hence eligibility and benefit amount in the Food Stamp Program. The utilities component of shelter cost can be significant, in turn. Hence, it seemed necessary to find some means of imputing utility payments amounts as part of the simulation of food stamp eligibility. Wave 2 cross-section analysis files used in earlier studies of Food Stamp Program participation were used to augment information available on the concatenated file. Although an exact match of records was not possible[2] the cross-section file provided a useful set of average payment amounts to impute to the longitudinal file. Average amounts by household size were therefore tabulated from the Wave 2 file and entered as a look-up table in the routine for simulating eligibility on the longitudinal file. Households with particular types of payments indicated via the payments flag were assigned an average amount for that tax or utility payment based on the table of averages by household size. These amounts were then combined with other reported shelter costs by household to estimate the excess

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[1]This action was apparently motivated by concerns about confidentiality issues that become more pressing as the amount of information on each household record expands.

[2]Household identification numbers have been scrambled by Census.

shelter cost deduction. The details of this and other aspects of the eligibility simulation are included in the next section.

Documentation of Eligibility Simulation

Purpose. The purpose of this simulation is to estimate eligibility for food stamps, for households in the 1979 ISDP Panel.

Unit of Analysis. The analysis unit for eligibility simulation, as for other aspects of this research, is the household. Although food stamp unit composition is available on the ISDP/RAMIS II file for households receiving food stamps, we base analysis on households rather than food stamp units for several reasons. The primary reason is that food stamp units exist only for recipient households. Since the eligibility analysis deals with both recipients and nonrecipients, the food stamp unit cannot be the focus of analysis. Further, the longitudinal unit in the RAMIS II file is the household, not the food stamp unit. Finally, the eligibility and benefit determination in the Food Stamp Program is, in general, based on households. In the majority of food stamp recipient households in the ISDP Panel the household and the food stamp unit are the same.[1]

[1]In Wave 2, for example, over 80 percent of recipient households report a single food stamp unit including all household members. Among the remaining households, some report all members covered, but by two or more separate food stamp units, and some report the presence of non-recipient individuals (Lubitz and Whitmore, 1982).

Table of Contents

Program Parameters. The program parameters used to simulate food stamp eligibility are those in effect in July of 1979, summarized as follows:

- Coupon allotment and net income maximum, by household size:

HH SIZE	COUPVAL	INSCREN
1	$ 61	$306
2	112	403
3	161	500
4	204	596
5	242	693
6	291	790
7	321	886
8	367	983
each additional person	47	97

- Standard deduction = $70
- Cap on dependent care/excess shelter deductions = $90
- Benefit reduction (tax) rate = 30%
- Earnings deduction = 20% of earned income
- Minimum bonus for 1 and 2-person households = $10
- Asset limits = $1750 ($3000 for elderly households with 2 or more persons).

The steps in determining eligibility are as follows:[1]

(1) Identify household with elderly or disabled members:

$ELDDIS_m = 1$ if $NOELD_m > 0$ and/or if $NODISAB_m > 0$

where, $NOELD_m$ is on the longitudinal unit file and

$NODISAB_m$ = # of persons w/$PRESHH_m = 1$ and DISAB1 = 1

otherwise $ELDDIS_m = 0$ (no elderly or disabled persons in household)

(2) Calculate household financial asset holdings by a rate of return to asset income method:

$$ASSETS_m = \frac{(INTAMT_m + DICIDAMT_m + NETRNT_m + OASSETS_m)}{.065/12}$$

[1]For details of variable construction and definitions see the Record Format Description (MPR, 1983).

(3) Apply asset eligibility screen

If $ASSETS_m \leq 1750$ then ASSELG=1
If $ASSETS_m \leq 3000$ and ELDDIS=1 and $HHSIZE \geq 2$
then ASSELG=1
otherwise ASSELG=0

(4) Calculate household monthly gross income

$$GROSS_m = WAGES_m + SELF_m + SSECRR_m + SSIAMT_m + UNMCAMT_m$$
$$+ VETAMT_m + COMPAMT_m + AFDCAMT_m + OWELFAMT_m$$
$$+ CLDSUPAMT_m + PPNSAMT_m + GPNSAMT_m + EDASSTAMT_m$$
$$+ ALIMAMT_m + ROYALAMT_m + OEARNAMT_m + INTAMT_m$$
$$+ DIVDAMT_m + NETRNTAMT_m + OASSETAMT_m$$
$$+ MISCAMT_m - STUEARN_m$$

(5) Calculate deduction amounts

If $GROSS_m \leq 0$, skip deductions and net income and go to eligibility step
DED_m = STAND + EARN + DCARE + EXSHEL

(5a) STAND = 70 (standard deduction)

(5b) EARN = max [0, (.2*(WAGES+SELF+OEARNAMT))]
(earnings deduction)

(5c) DCARE = min [KIDCARE+DEPCARE, WAGES+SELF+OERNAMT, $90]
(dependent care deduction)

(5d) EXSHEL = min [SHELCOST-.5*($GROSS_m$-STAND-EARN-DCARE), 90-DCARE]
(excess shelter cost deduction)

where SHELCOST = HOUSECOST + UTILCOST
HOUSECOST = RENTMHS + DEBTMHS + DEBTMH2
+ DEBTHM12 + CONDOFEE2 + RENT2

(all from Wave-Specific file)

UTILCOST = sum of imputed utilities costs

Table of Contents

Imputed utilities costs must be used since we know whether a household paid certain types of utilities but not how much. Impute average amounts, by utility type, to households who pay for that type of utility, as follows:

if nth digit of UTILITY2 is:	Assign utilities cost as:
1st = 1,	MONTAXES = average $MONTAXES_i$
1st = 0,	MONTAXES = 0
2nd = 1,	MONINSUR = average $MOININSUR_i$
2nd = 0,	MOINSUR = 0
3rd = 1,	MONOIL = average $MOIOIL_i$
4th = 1,	MONWATER = average $MONWATER_i$
4th = 0,	MONWATER = 0
5th = 1,	MONTRASH = average $MONTRASH_i$
5th = 0,	MONTRASH = 0
6th = 1,	MONELGAS = average $MONELGAS_i$
6th = 0,	MONEGLAS = 0
7th = 1,	MONGAS = average $MONGAS_i$
7th = 0,	MONGAS = 0
8th = 1,	MONELEC = average $MONELEC_i$
8th = 0,	MONELEC = 0

where UTILITY2 is on the wave-specific data file and averages are distributed from look-up tables arrayed by household size.

If PHONE2 = 1, PHONE = $20
else PHONE = 0

UTILCOST = MONTAXES + MONINSUR + MONOIL + MONWATER + MONTRASH + MONELGAS + MONGAS + MONELEC + PHONE

(6) Calculate household monthly net income

$NET_m = GROSS_m - DED$

(7) Apply net income screen

$HHSIZE_m = NOADS_m + NOTEENS_m + NOKIDS_m + NOBABS_m$

if HHSIZE =	1	and NET $\leq$	306 then $INCELG_m$ = 1
"	2	"	406 "
"	3	"	500 "
"	4	"	596 "
"	5	"	693 "
"	6	"	790 "
"	7	"	886 "
"	8	"	983 "
"	> 8	"	983+97*(HHSIZE-8) "

else $INCELG_m$ = 0

if ASSELG = 1 and INCELG = 1 then FSELG = 1
else FSELG = 0

(8) Calculate expected benefit

if $FSELIG_m = 0$, $EXBEN_m = 0$

if $FSELIG_m = 1$ and
if $HHSIZE_m = 1$ then $EXBEN_m = \max [10, 61-.30*NET_m]$

" 2 " = $\max [10, 112-.30*NET_m]$
" 3 " = $161 - .30*NET_m$
" 4 " = $204 - .30*NET_m$
" 5 " = $242 - .30*NET_m$
" 6 " = $291 - .30*NET_m$
" 7 " = $321 - .30*NET_m$
" 8 " = $367 - .30*NET_m$
" > 8 " = $367+46*(HHSIZE - 8) - .30*NET_m$

(9) Calculate ratio of expected benefit to poverty line:

if HHSIZE = 1, $BENPOV_m = EXBEN_m/306$
" 2 " " /403
" 3 " " /500
" 4 " " /596
" 5 " " /693
" 6 " " /790
" 7 " " /886
" 8 " " /983
" > 8 " " /[983+97*(HHSIZE - 8)]

(10) Create a summary income response variable by household by month:

$GROSSRESP_m = NRESP_m/TYPES_m$

where $NRESP_m$ is the number of income types for which the response flag >0 (indicating at least one household member reported recipiency but no amount for a particular income type) and $TYPES_m$ is the number of income types for which either the amount (AMT) or the response flag (RESP) is positive.

if WAGES=Ø and WAGERESP=0 then NTYPES = NTYPES + 1
else if WAGERESP >0 then NTYPES = NTYPES+1 and NRESP = NRESP+1

repeat for all income types in $GROSS_m$ for the household and output:

$GROSSRESP_m = NRESP_m/NTYPES_m$

(11) Create a similar variable for asset income response where the income type and response flags used are: $INTAMT_m$, $INTRESP_m$, $DIVIDAMT_m$, $DIVIDRESP_m$; $NETRNTAMT_m$, $NETRNRESP_m$; $OASSERAMR_m$, $OASSETRESP_m$.

$$ASSETRESP_m = NRESPA_m/NTYPES_m$$

Estimates of Participation Transitions Conditional on Eligibility

In this paper, we have considered transitions in eligibility and in participation separately. There are several reasons for choosing this approach, an important one being the necessity of restricting the sample for eligibility analysis more than was necessary or desirable for analysis of participation. It is possible to estimate participation transition rates for eligibles only, however, and Table B.1 presents such estimates.

There are several ways to calculate exit and entrance rates for eligible households, depending on the period in which eligibility is determined. We have presented two variations--one in which eligibility status is determined for the month of transition (exit or entrance) and one in which eligibility refers to the month preceding transition. Thus E1 in Table B.1 is the probability of entrance conditional on eligibility in the month of entrance. Averaging over July-December 1979 (the months for which our eligibility simulation most closely represents actual program rules) the conditional entrance rate is about 2.6 percent. Note that this rate is several times larger than the "unconditional" entrance rate estimated in Chapter III at 0.5 percent.

An alternative entrance rate, E2 in Table B.1, estimates the entrance rate given eligibility in the preceding month, and is somewhat lower than E1, though still about 2 percent.

Exit rates may also be restricted to eligible households, and as expected are lower than estimates based on all households. The probability of exit, given eligibility in the current month, is about 3.7 percent. The probability, given eligibility in the previous month, is about 4.6 percent.

Both estimates (X1 and X2 in Table B.1) are lower than the unconditional exit rate of 7.3 percent presented in Chapter III, illustrating the perhaps obvious point that eligible households are less likely to leave the program than those who have become ineligible.

Table of Contents

Table B.1

Calculation of Conditional Transition Rates

Month	Food Stamp Eligibility and Participation Status (Households Weighted in Thousands) (1) Elg(m) Entr(m)	(2) Elg(m) Exit(m)	(3) Elg(m) Part(m)	(4) Elg(m) NP(m)	(5) ENP(m-1) Entr(m)	(6) EP(m-1) Exit(m)	Conditional Transition Rates (Given Eligibility) Entrance Rates E1	E2	Exit Rates X1	X2
Jan	344	136	2,793	10,137						
Feb	208	105	2,645	9,476	329	157	2.2%	3.2%	4.1%	5.6%
Mar	262	149	2,746	7,994	229	107	3.2%	2.4%	5.7%	4.0%
Apr	307	192	2,809	7,238	341	231	4.2%	4.3%	7.1%	8.4%
May	128	152	2,709	7,347	109	181	1.7%	1.5%	5.6%	6.4%
Jun	142	101	2,706	8,110	146	132	1.7%	2.0%	3.8%	4.9%
Jul	134	78	2,661	8,851	94	169	1.5%	1.2%	3.0%	6.2%
Aug	43	72	2,335	7,027	74	101	.6%	.8%	3.0%	3.8%
Sep	246	97	2,713	6,473	237	124	3.7%	3.4%	3.8%	5.3%
Oct	207	84	2,784	5,041	158	97	4.0%	2.4%	3.2%	3.6%
Nov	255	41	2,937	5,751	107	52	4.3%	2.1%	1.5%	1.9%
Dec	93	212	2,742	5,949	94	195	1.6%	1.6%	7.4%	6.6%
Sum	2,369	1,419	32,580	89,394	1,918	1,546				
Average	197	118	2,715	7,450	174	141	2.6%	2.3%	4.4%	5.2%
Part-year Average*	163	97	2,695	6,515	127	123	2.6%	1.9%	3.6%	4.6%

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

(1)Eligible in month of entrance
(2)Eligible in month of exit
(3)Eligible participants
(4)Eligible nonparticipants
(5)Eligible in month preceding exit
(6)Eligible in month preceding exit

E1=Pr(Entr|Elig. this mo.) = (1)m/[(4)m+(1)m-(2)m]
E2=Pr(Entr|Elig. last mo.) = (5)m/(4)m-1
X1=Pr(Exit|Elig. this mo.) = (2)m/[(3)m+(2)m-(1)m]
X2=Pr(Exit|Elig. last mo.) = (6)m/(3)m-1

*July - December

APPENDIX C

STATISTICAL ISSUES

The Markov model

The several variants of Markov and semi-Markov models that are found in the statistical literature are used to predict the movements of units of observation among states over time. For the purpose of this report, the units of observation are households, and there are two states between which they move: participation in the Food Stamp Program and nonparticipation.[1] In the simplest form of the Markov process, the probability that a unit moves from state i to state j between two periods is p_{ij}. (We refer to these probabilities generically as transition probabilities.) Hence, if the first state is participation and the second state is nonparticipation, the exit probability is p_{12}, and the probability of entering the program is p_{21}.

We have taken the observed sample exit and entry rates in the tabular analysis as estimates of p_{12} and p_{21}, respectively. More specifically, we have estimated separate transition probabilities for subsets of the population defined by the stratifiers; e.g., households with an elderly or disabled person versus other households. Similarly, in our multivariate analysis we predict unique transition probabilities for each combination of household characteristics that are used as explanatory variables.

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[1] In some applications, we have looked at eligibility versus ineligibility.

Functions of Entry and Exit Rates

Certain functions of entry and exit rates that are of interest can be calculated in a fairly straightforward fashion. One such number is the annual/monthly ratio. The derivation of this ratio is as follows.

The probability that a household will receive Food Stamps in a twelve-month period is the probability that household is currently in the program, or that it will enter the program at some point during the next eleven months. Perhaps an easier way of approaching this problem is involves recognition of the fact that the probability of not receiving Food Stamps in the course of a year is the probability that that household does not receive food stamps in the current month, and in addition that that household did not receive food stamps in any of the next eleven months.

Given the assumptions underlying the simple Markov model (most notably that events such as entry and exit in successive months are statistically independent of each other), the probability that a sequence of two events will occur is the product of the respective probabilities that each event will occur separately. The probability that a household will not participate in the program either in this month or the next month is

$$NP_2 = (1-p_1) * (1 - p_{21}), \qquad (C.1)$$

where p_1 is the probability of participating in the first month and p_{21} is the probability that a nonparticipant will enter the program in the second

[1]We abstract from complications caused by the possibility that the household might not be in existence over the entire twelve-month period.

month. By similar reasoning, the probability of not participating at all over the twelve-month period is

$$NP_{12} = (1 - p_1) * (1 - p_{21})^{11}, \qquad (C.2)$$

the annual participation rate is

$$p_A = 1 - (1 - p_1) * (1 - p_{21})^{11}, \qquad (C.3)$$

and the ratio of the annual participation rate to the monthly participation rate is

$$AMR = p_A/p_1. \qquad (C.4)$$

Furthermore, it can be shown[1] that in this model, there will be a long-run tendency toward an equilibrium participation rate of

$$p_1 = p_{21}/(p_{12} + p_{21}), \qquad (C.5)$$

regardless of the initial distribution of participants and nonparticipants. Also, the expected (i.e., mean) duration of participation in the program is

$$D = 1/p_{12} \qquad (C.6)$$

[1]See Chiang (1980).

Duration Issues

One of the questions raised about turnover in the Food Stamp Program is whether or not households who have been receiving food stamp benefits for a long time are less likely to leave the program than those with shorter periods of recipiency. This is really two questions, as follows. First, do exit rates differ; i.e. is the caseload heterogeneous with respect to exit rates? The evidence presented in Chapter III is clear on this point--there is wide and somewhat systematic variation in exit rates across households; the food stamp population is quite heterogeneous in this respect. The second question is whether or not individual households' exit rates change over time--does the likelihood of leaving the program decline, for example, with longer periods of participation? This second question cannot be answered based on the data analyzed here.

However, even without clear evidence on whether individual households' exit rates are constant over time, there are important implications of the finding of heterogeneity for interpreting aggregate turnover measures such as those presented in the preceding tables.

Average vs. cohort turnover. In the previous discussion in this paper, entrance and exit rates are computed as an average of month-to-month transitions over the year. In the aggregate, or for any given subgroup, exit rates for eleven months are averaged, where each monthly rate expresses the proportion of the previous month's caseload that has left the program by the current month. An alternative exit rate can, however, be constructed: the exit rate for a "cohort" of participants. If a "cohort" is identified as all households (or all households of a given type) who are

participating in a given month[1] then an exit rate for some period can be constructed based on this cohort alone. Over a twelve-month observation period this rate would be the proportion of participants in the first month who have left the program by the twelfth month. A model of unemployment turnover developed by Salant (1977) is applicable to this situation. Salant's "sorting model" demonstrates why exit rates in a cross section will differ from those for a starting cohort, if the population of interest is heterogeneous. Even if individual exit rates are constant over time, the fact that individual exit rates differ results in declining aggregate exit rates over time for a given cohort. In a given cohort--e.g. food stamp participants in January--those units with higher individual exit rates will be more likely to have left the program in subsequent months. By some later month the average exit rate for the remaining members of the cohort is lower than it was in the early months. To paraphrase Salant, "...as they pass through [the Food Stamp Program] the people with relatively high escape rates will tend to leave more quickly until eventually only the sluggish members of the original cohort remain. Hence, although each person has a constant escape rate, the tendency of the higher escape rate people to 'sort' themselves out sooner makes the average rate for the group decline." (Salant, 1977, p. 45).

A simple example illustrates this phenomenon. Consider a population that is heterogeneous with respect to exit rates but for simplicity allow only two different groups--a high turnover group, sharing the same

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[1]Note that these need not be households who begin participating in the same month; the concept requires only that a single starting point be selected to begin following the cohort.

high exit rate, and a low-turnover group with equal low exit rates. Assume the flows in and out of the program are equal in each period so that the caseload level stays constant.

Table C.1 contrasts the transition estimates associated with the aggregate caseload with those associated with a particular cohort, where a cohort is defined as all households participating in a particular month who are then observed in suceeding months. In the first month, we observe a 200-unit caseload composed of 100 high-turnover households (each of which has a monthly exit rate of 80 percent) and 100 low-turnover households (with exit rates of 20 percent). This defines the cohort of month one participants, as well as the entire caseload for month one.

In the second month, 80 percent of the high turnover households and 20 percent of the low turnover households, or a total of 100 households, leave the program. The month two exit rate (exits in month two divided by participants in month one) is 100/200, or 50 percent. In month two, the exit rate is the same whether the universe being considered is the month one cohort or the aggregate caseload, since they are identical for month one. In month two, however, there are new entrants into the aggregate caseload, replacing the households who exited this month. Although they have no effect on the exit rate measured in month two, they will have an effect in month three. 80 new high-turnover households and 20 new low-turnover households enter the program, so that the level of participation (the aggregate caseload) remains at 200. However, only 100 households remain from the original cohort, and if only this cohort is analyzed, the new entrants are ignored.

TABLE C.1

COHORT AND AGGREGATE EXIT RATES

	Cohort Only		Aggregate Caseload	
	Exit	Remain	Exit	Remain
Month 1	--	100H 100L		100H 100L
Month 2	80H 20L 100	20H 80L 100	80H 20L 100	20H (from month 1) 80H (new entrants) 100H 80L (from month 1) 20L (new entrants) 100L
	(Exit Rate = $\frac{100}{200}$ = .50)		(Exit Rate = 100/200 = .50)	
Month 3	16H 16L 32	4H 64L 68	80H 20L 100	4H (remaining from month 1) 64H (remaining month 2 entrants) 80 (month 3 entrants) 100H 64L (remaining from month 1) 16L (remaining month 2 entrants) 20L (month 3 entrants) 100L
(Exit Rate = $\frac{32}{100}$ = .32)			(Exit Rate = 100/200 = .50)	

H: high-turnover households (exit rate = .80)
L: low-turnover households (exit rate = .20)

In the third month, 80 percent of the high turnover households and 20 percent of the low-turnover households leave. For the aggregate caseload, the monthly exit rate is again 100/200, or 50 percent. For the original cohort, however, the exit rate declines. 80 percent of the remaining 20 high-turnover households (16 households) and 20 percent of the remaining 80 low-turnover households (16 households) now leave the program. For this cohort, the month three exit rate is 32 (members of the original cohort leaving in month three) divided by 100 (members of the original cohort participating in month two), or 32 percent. While the aggregate monthly exit rate is still .50, the exit rate for the month one cohort has declined to .32. This result will obtain with constant individual exit rates over time, as long as there are differences among participants in exit rates (the population is heterogeneous with respect to probabilities of transition in and out of the program). The declining cohort exit rate does not indicate that individuals exit rates decline over time, although if they do, the cohort exit rate will decline even more.

We have not constructed monthly exit rates for different cohorts for this paper. However, an 11-month exit rate can be calculated for the January cohort. We know the number of participants in January, 1979 (Table E.1 in Appendix E) and we also know the number of participants who were in the program for a full 12 months (Table III.1). Thus the proportion of the January cohort that exits during the year can be calculated as:

$$\frac{4021-1843}{4021} = 54.17\%$$

The monthly average exit rate obtained from this eleven-month total is 6.8 percent,[1] which is somewhat lower than the average of eleven aggregate monthly exit rates of 7.3 percent.

These two alternative exit rates are not contradictory but they do address different questions. Suppose the question is, "for any given month, what proportion of the caseload (or subgroup) can be expected to leave the program by the next month?" The aggregate monthly exit rate estimate is appropriate to address that question. Suppose, however, the question asked is "what portion of the current caseload (or subgroup) will have left the program within a given period?" Unless the period considered is a single month, the aggregate average monthly exit rate is not the appropriate estimate; the cohort exit rate is. The differences can be fairly large--for example, elderly households have an average monthly exit rate of 5.3 percent. Extrapolating that estimate for eleven more months would imply that $1-(1-.053)^{11}$ or 45 percent--almost half--will leave by the end of a year. This would be valid if all elderly households had the same constant exit rate, and a cohort exit rate would yield the same result. In fact, the eleven-month cohort exit rate for the elderly, estimated as the percent of the elderly participants in January who have left by December, is only 33 percent. This might be an important difference for policy purposes. Further, it is evidence that exit rates may vary significantly within the subgroups identified in the tabular analysis.

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[1]From Table III.1, 33.4 percent of 5,526 thousand ever-participants, or 1,843 thousand households, participated for all 12 months of 1979. Since $4021(1-r)^{11} = 1843$, $r = 1 - (1843/4021)^{1/11}$, or .0685.

A supplemental table in Appendix D (Table D.12) presents exit rates for starting cohorts by various household characteristics. The cohorts' monthly average exit rates turn out to be uniformly lower than the average of aggregate monthly rates. As mentioned above, this does not necessarily imply that individual exit rates decline with longer duration. However, if that is in fact the case (or even if the reverse is true) the cohort exit rate captures that effect as well as the "sorting" effects.

Expected duration. Average duration of spells of food stamp participation is a difficult concept, and in fact it is not possible to measure average duration precisely based on tabulations of a limited duration sample. The one-year ISDP sample used in the present analysis largely captures spells that are truncated--we may observe their beginning or end, but not often both.

Even if we knew the duration to date of spells in progress at the beginning of the sample it would still not be possible to construct an unbiased estimate of "final duration" or completed spell length. As Salant and others have demonstrated, estimates based on in-progress spells result in biased measures of duration for at least two reasons. First, spells observed at random will on average (and under stable conditions) be halfway completed, so that the duration to date will be one-half the expected duration--this is called interruption bias by Salant (1977). Further, if spells of different lengths are randomly distributed, the probability of observing a long spell in a finite observation period is greater than that of observing a short spell--this is due to sampling from a length-biased population (Salant, 1977; Kaitz, 1970).

Under certain fairly restrictive assumptions, the expected total duration of a spell of participation can be estimated from exit rates. For an individual, expected duration is one over the exit rate, provided only that the individual's exit rate is constant over time.[1] For this to hold in the aggregate requires in addition that individuals are homogeneous with respect to exit rates.[2] For the food stamp caseload in the aggregate this does not appear to be the case, since estimated exit rates vary widely for different types of households. The argument can be made that within-group variation is minimized by disaggregating the population along characteristics assumed to be associated with differences in transition behavior. However, even if we are willing to accept this premise, the assumption of constant individual exit rates over time must be met. This is not intuitively appealing, since it seems reasonable to expect for example, that for some participants the exit probability increases over time--think of a worker receiving food stamps while on temporary layoff, whose probability of recall increases with each month out of work. Opposite cases may also be hypothesized--suppose that for some types of households the stigma associated with food stamp receipt is acute in early months but declines over time, so that if other factors are equal the probability of leaving the program also declines.

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[1]Such an individuals' average monthly exit rate is one over the number of months in a spell of participation; $x_m = 1/M$. Thus, duration, M, is $1/x_m$--the reciprocal of the exit rate.

[2]Expected duration estimated from exit rates under these assumptions ranges from 7.7 to 40 months depending on households type. These estimates are included in Appendix D (Table D.11).

Such surmises aside, the real question is what difference in estimated duration result if the two homogeneity assumptions do not hold. Salant argues that the set of possible situations consistent with declining cohort exit rates are four: if the population is homogeneous, individual exit rates must decline over time; if the population is heterogeneous, then either constant, increasing, or decreasing individual exit rates are consistent with the evidence. This determination cannot be made with existing data.

Despite the inherent limitations of inferring duration from a finite observation period, further work on these issues may be worthwhile.

The RATE model[1]

The RATE model is a statistical algorithm for the estimation of a multivariate model of entry and exit rates. The parameters of the model are estimated by the method of maximum likelihood, which has a number of well-known desirable statistical properties; use of maximum likelihood also permits the computation of familar test statistics such as asymptotic t ratios and chi-square statistics.[2]

Let us assume that there are two states that a household can occupy, namely, participation in the Food Stamp Program and nonparticipation. (The treatment of eligibility versus ineligibility is entirely analogous to the case of participation versus nonparticipation, and will not be considered separately here.) We denote participation by the subscript 1 and nonparticipation by the subscript 2. The RATE model specifies that the instantaneous transition rate between states i and j,

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[1]Unless otherwise noted, this discussion is based on Tuma et al. (1979).

[2]For instance, see Hogg and Craig (1971).

which we denote by r_{ij}, is a function of a set of k explanatory variables:

$$\text{in } r_{ij} = \beta_{oi} + \beta_{1i}X_1 + \beta_{2i}X_2 + \ldots + \beta_{xi}x_k. \qquad (C.7)$$

In this example, r_{12} is the instantaneous exit rate and r_{21} is the instantaneous entry rate.[1] Monthly (discrete) entry and exit rates are derived by forming the matrix

$$R = \begin{bmatrix} -r_{12} & r_{12} \\ r_{21} & -r_{21} \end{bmatrix} \qquad (C.8)$$

and performing the matrix operation

$$P = e^R = I + R + \tfrac{1}{2}R^2 + 1/6R^3 + \ldots, \qquad (C.9)$$

where I is the identity matrix. The off-diagonal elements of P, p_{12} and p_{21}, are the exit rates and entry rates, respectively.

[1]At this point two comments should be made. First, a linear specification of the basic equation is possible. We chose a semilogarithmic specification because it is most intutitively plausible; in particular, it guarantees that predicted values of r_{ij} are always positive, as they should be. Second, it is possible to apply the RATE model to cases where three or more states are defined; here we focus on the application to the two-state case that is actually used in this report. For further details, see Tuma (1980).

A variant of equation (C.7) was applied for the purpose of this report.[1] In this variant, the transtion rate is a function of the vector of explanatory variables multiplied by a random error term e_{ij}, that has a gamma distribution with a mean of unity and a variance of σ^2:

$$\ln r_{ij} = (\beta_{oi} + \beta_{1i}X_1 + \beta_{2i}X_2 + \ldots + \beta_{ki}X_k)e_{ij}. \quad (C.10)$$

[1]There are yet more complicated specifications of the RATE model that could be applied which are not discussed here; see Tuma (1980) for further details.

APPENDIX D

SUPPLEMENTAL TABLES

At a number of points throughout the analysis presented in this report, we have produced tabulations based on the ISDP data that are useful in that they expand on or clarify points made in the text; for instance, by showing whether the conclusions reached on the basis of the tabulations reported in the text are sensitive to underlying assumptions. In the interest of preserving the continuity of the discussion in the text, we have chosen to present in the main text those empirical findings that form the basis of our "main" analysis. Additional findings that are referred to in the text have been collected in this appendix.

The tables that we have included in this appendix are as follows:

Table of Contents

TABLE D.1

COUNTS OF HOUSEHOLDS WITH FOOD STAMPS
BY CALENDAR MONTH
(1979)

Month	Weighted Count (Thousand)	% of Average Monthly Count
January	4021	100.7
February	4196	105.1
March	4206	105.3
April	4130	103.4
May	3832	95.9
June	3871	96.9
July	3810	95.4
August	3823	95.7
September	3817	95.6
October	4002	100.2
November	4198	105.1
December	4019	100.6
Average	3994	

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel--Sample counts weighted by Wave 1 relative weights--not population-representative counts.

Table of Contents

COUNTS OF HOUSEHOLDS WITH FOOD S
BY SELECTED UNIT CHARACTERISTICS
AVERAGE MONTHLY LEVELS

	Count (thousands)	% of Total
TOTAL	3994	100.0
AFDC Status		
AFDC Recipient	1018	25.5
Non-recipient	2919	73.1
Other Welfare[1]		
Recipient	384	9.6
Non-recipient	3553	89.0
Age of Head		
1.t. 25	559	14.0
25-44	1718	43.0
45-59	765	19.2
60-64	140	3.5
65+	812	20.3
Family Status		
Married w/children	986	24.7
Single w/children	1470	36.8
Married, no children	344	8.6
Single, no children	1193	29.9
	2	0.1
Race		
White	2447	61.3
Non-White	1547	38.7
Unit Size		
1	892	22.3
2	754	18.9
3-4	1168	29.2
5+	1180	29.5

	Count (thousands)	% of Total
Children Under 19		
None	1539	38.5
1	634	15.9
2+	1820	45.6
Children Under 6		
None	2698	67.6
1	933	23.4
2+	362	9.1
Highest Grade Completed (head)		
1.t. 9th	1567	29.2
9th-11th	1095	27.4
12th	1070	26.8
Some College	262	6.6
Presence of Earners		
Present in Unit	1784	44.7
Not Present	2152	53.9
Elderly[2] or Disabled Persons		
Elderly	905	22.4
Disabled	678	17.0
Both	200	5.0
Neither	2211	55.4

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

[1]GA and/or Emergency Assistance.

[2]60 or over.

TABLE D.3

COUNTS OF ELIGIBLE HOUSEHOLDS
BY MONTH
(1979)

Month	Count (Thousand)	% of Average Monthly Count
January	12,931	127.2
February	12,122	119.3
March	10,741	105.7
April	10,047	98.8
May	10,056	98.9
June	10,817	106.4
July	11,514	113.3
August	9,362	92.1
September	9,186	90.4
October	7,826	77.0
November	8,688	85.5
December	8,691	85.5
Average	10,165	

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel--Sample counts weighted by Wave 1 relative weights--not population-representative counts.

Universe: Restricted to units with no sample attrition and at most some income non-response.

TABLE D.4
COUNTS OF ELIGIBLES
BY SELECTED UNIT CHARACTERISTICS
(AVERAGE MONTHLY LEVELS)

	Count (thousands)	% of Total
TOTAL	10165	100.0
AFDC Status		
AFDC Recipient	809	8.0
Non-recipient	9356	92.0
Other Welfare[1]		
Recipient	338	3.3
Non-recipient	9827	96.7
Age of Head		
l.t. 25	1045	10.3
25-44	3177	31.3
45-59	1915	18.8
60-64	814	8.0
65+	3214	31.6
Family Status		
Married w/children	2361	23.2
Single w/children	1892	18.6
Married, no children	1632	16.1
Single, no children	4022	39.6
Race		
White	7815	76.9
Non-White	2183	21.5
Unit Size		
1	3738	36.8
2	2228	21.9
3-4	2418	23.8
5+	1531	15.1

	Count (thousands)	% of Total
Children Under 19		
None	5910	58.1
1	1475	14.5
2+	2781	27.4
Children Under 6		
None	7996	78.7
1	1307	12.9
2+	583	5.7
Highest Grade Completed (head)		
l.t. 9th	3642	35.8
9th-11th	2242	22.1
12th	2914	28.7
Some College	1368	13.5
Presence of Earners		
Present in Unit	4594	45.2
Not Present	5572	54.8
Elderly[2] or Disabled Persons		
Elderly	3649	35.9
Disabled	1065	10.5
Both	652	6.4
Neither	4799	47.2

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

Univese: Restricted to units with no sample attrition and at most some income non-response.

[1] GA and/or Emergency Assistance.

[2] 60 or over.

Table of Contents

TABLE D.5

FOOD STAMP PARTICIPATION ENTRANCE PROBABILITIES BY CALENDAR MONTH, (1979)

Month	Entrance Probability
February	0.68
March	0.70
April	0.72
May	0.31
June	0.52
July	0.30
August	0.52
September	0.55
October	0.56
November	0.66
December	0.26
Average	0.53

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

$$\text{Entrance probability in month m} = \frac{\text{Entrances into FSP in month m}}{\text{FSP non-participants in month m-1}}$$

$$\text{Average entrance probability} = \frac{\sum_{m=2}^{12} \text{Entrances}}{\sum_{m=1}^{11} \text{Non-Participants}}$$

TABLE D.6

FOOD STAMP PARTICIPATION EXIT PROBABILITES
BY CALENDAR MONTH, (1979)

Month	Exit Probability
February	7.1
March	9.2
April	10.0
May	9.4
June	6.0
July	6.4
August	5.6
September	10.1
October	4.9
November	3.8
December	6.9
Average	7.3

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

$$\text{Exit probability in month m} = \frac{\text{Exits into FSP in month m}}{\text{FSP non-participants in month m-1}}$$

$$\text{Average exit probability} = \frac{\sum_{m=2}^{12} \text{Exits}}{\sum_{m=1}^{11} \text{Participants}}$$

TABLE D.7

ELIGIBILITY ENTRANCE RATES
BY CALENDAR MONTH, (1979)

Month	Entrance Probability
February	7.07
March	5.02
April	5.84
May	8.08
June	8.66
July	8.31
August	3.37
September	7.71
October	3.75
November	6.59
December	4.73
Average	6.30

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

Universe: Restricted to units with no sample attrition and at most some income nonresponse.

$$\text{Entrance probability in month m} = \frac{\text{Entrances to Eligibility in month m}}{\text{Ineligibles in month m-1}}$$

$$\text{Average entrance probability} \quad \frac{\sum_{m=2}^{12} \text{Entrances to eligibility}}{\sum_{m=1}^{11} \text{Ineligibles}}$$

TABLE D.8

ELIGIBILITY EXIT RATES
BY CALENDAR MONTH, (1979)

Month	Exit Probability[1]
February	17.69
March	20.40
April	19.11
May	18.34
June	11.34
July	10.51
August	23.62
September	19.77
October	24.52
November	9.10
December	12.43
Average	17.25

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

Universe: Restricted to units with no sample attrition and at most some income non-response.

$$\text{Exit probability in month m} = \frac{\text{Exits from eligibility in month m}}{\text{Eligibles in month m-1}}$$

$$\text{Average entrance probability} = \frac{\sum_{m=2}^{12} \text{Exits from eligibility}}{\sum_{m=1}^{11} \text{Eligibles}}$$

Table of Contents

TABLE D.9

DURATION OF REPORTED PARTICIPATION
BY SELECTED UNIT CHARACTERISTICS
(1979)

	Number of Months on Program (% of total)				
	1-3	4-6	7-11	12+	Number (1000's)
Total	32.0	16.9	24.4	26.5	6954
AFDC Status					
Recipient	14.1	29.2	34.9	21.6	1089
Nonrecipient	35.3	14.7	22.4	27.4	5857
Other Welfare[1]					
Recipient	40.3	14.9	17.2	27.3	515
Nonrecipient	31.3	17.1	25.0	26.4	6441
Age of Head					
l.t. 25	29.5	25.2	24.3	20.8	1056
25-44	30.9	18.9	24.0	26.0	3111
45-59	39.3	16.8	18.8	24.9	1310
60-64	28.0	8.6	26.0	37.1	253
65+	29.9	6.3	31.3	32.3	1224
Family Status					
Married with children	38.3	25.4	17.9	18.2	1895
Single with children	22.3	16.9	29.2	31.3	2394
Married, no children	36.7	16.9	22.0	24.5	639
Single, no children	36.3	9.0	25.1	29.4	2015
Race					
White	37.4	14.8	22.6	24.9	4535
Nonwhite	21.8	20.8	27.7	29.5	2416
Unit Size					
1	32.1	5.0	31.9	30.8	1416
2	34.8	20.9	16.2	27.8	1430
3-4	39.1	17.1	22.4	21.2	2231
5+	21.2	22.7	27.3	28.7	1872

Table of Contents

Table III.9--continued

Children Under 19					
0	36.2	10.9	24.7	28.1	2666
1	30.3	24.2	21.7	23.6	1226
2+	29.0	19.3	25.3	26.3	3064
Children Under 6					
0	34.3	14.7	23.0	27.8	4766
1	23.9	19.1	33.6	23.1	1522
2+	34.0	27.4	13.4	25.1	664
Highest Grade Completed (Head)					
l.t. 9th	33.5	10.8	24.3	31.2	2598
9th-11th	30.7	16.7	20.7	31.7	1876
12th	24.7	25.3	29.8	20.0	1830
Some college	50.0	18.8	20.0	11.0	653
Presence of Earners					
Present in Unit	38.5	17.9	24.1	19.3	3565
None Present	25.1	15.9	24.7	34.1	3389
Elderly[2] or Disabled Persons					
Elderly	28.4	6.1	30.3	35.0	1370
Disabled	36.1	18.6	17.0	28.1	1258
Both	25.1	8.5	25.8	40.4	294
Neither	32.4	20.7	24.7	22.1	4036

Source: Calculated by Mathematica Policy Research, Inc. from 1979 ISDP Panel.

Universe: All ever-participant households, including those in sample part-year.

[1]GA and/or Emergency Assistance.

[2]60 or over.

Table of Contents

TABLE D.10

FOOD STAMP PARTICIPANTS BY NUMBER OF TOTAL SPELLS

	1 Spell	2 Spells	3+ Spells
Total	85.85%	12.92%	1.23%
AFDC Status			
Recipient	83.80	14.66	1.53
NonRecipient	86.23	12.60	1.17
Other Welfare[1]			
Recipient	75.94	24.06	0.00
Nonrecipient	86.64	12.03	1.32
Age of Head			
l.t. 25	84.85	13.46	1.69
26-44	84.86	14.52	0.62
45-59	84.07	14.45	1.48
60-64	88.07	11.93	0.00
65+	90.69	6.96	2.35
Family Status			
Married with children	85.24	12.87	1.89
Single with children	84.75	14.38	0.86
Married, no children	85.16	14.84	0.00
Single, no children	87.87	10.70	1.42
Race			
White	86.40	11.76	1.83
Nonwhite	84.82	15.10	.08
Unit Size			
1	89.39	8.58	2.03
2	88.51	10.72	0.77
3-4	84.24	14.58	1.18
5+	83.07	15.91	1.02

Table of Contents

Table D-10--continued

Children Under 19[1]			
0	87.28	11.65	1.08
1	87.33	11.76	.90
2+	84.02	14.49	1.49
Children Under 6			
0	86.82	12.29	0.89
1	85.80	11.39	2.81
2+	79.05	20.95	0.00
Highest Grade Completed (Head)			
l.t. 9th	87.65	10.50	1.84
9th-11th	88.33	11.10	0.57
High School	79.78	18.76	1.46
Some College	88.55	11.45	0.00
Presence of Earners			
Present in Unit	85.80	12.94	1.26
None Present	85.91	12.90	1.19
Elderly or Disabled			
Elderly	93.13	4.77	2.10
Disabled	84.67	15.32	0.01
Both	81.96	18.04	0.00
Neither	84.03	14.57	1.40

SOURCE: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

[1]Total Spells = True Spells + Artificial Spells where true spells of participation are bounded by either periods of non-participation or starting/ending points of sample period; all other spells designated "artificial."

PREDICTED MEASURES OF FOOD STAMP TURNOVER
BY SELECTED UNIT CHARACTERISTICS
(1979)

	PARTIC. RATE	ENTRY RATE	EXIT RATE	ANNUAL PARTIC. RATE	ANNUAL MONTHLY RATIO	EXPECTED DURATION	STEADY-STATE PARTIC. RATE
TOTAL	5.92	0.53	7.3	11.3	1.90	13.7	6.77
AFDC Status							
Recipient	70.84	1.13	2.5	74.3	1.05	40.0	31.13
Nonrecipient	4.53	.47	8.9	9.4	2.06	11.2	5.02
Other Welfare[1]							
Recipient	60.21	.86	3.2	63.8	1.06	31.3	21.18
Nonrecipient	5.44	.51	7.7	10.6	1.95	13.0	6.21
Age of Head							
l.t. 25	7.08	0.64	7.1	13.4	1.89	14.1	8.27
25-44	6.46	0.59	7.7	12.4	1.91	13.0	7.12
45-59	4.86	0.41	7.9	9.1	1.87	12.7	4.93
60+	5.51	0.48	6.0	10.4	1.88	16.7	7.41
Family Status							
Married w/children	4.2	0.47	11.7	9.0	2.14	8.5	3.86
Single w/children	25.7	2.51	4.7	43.8	1.70	21.3	34.81
Married, no children	1.8	0.16	8.5	3.5	1.94	11.8	1.85
Single, no children	6.2	0.52	6.4	11.4	1.84	15.6	7.51
Race							
White	4.11	0.42	8.2	8.4	2.06	12.2	4.87
Nonwhite	18.89	1.45	5.9	30.9	1.64	16.9	19.73
Unit Size							
1	5.93	0.48	5.6	10.8	1.82	17.9	7.89
2	3.62	0.32	7.4	7.0	1.92	13.5	4.15
3-4	5.22	0.48	9.3	10.1	1.94	10.8	4.91
8+	12.65	1.25	6.1	23.9	1.89	16.4	17.01
Children Under 19							
0	4.01	0.34	6.9	7.5	1.88	14.5	4.70
1	5.51	0.59	7.4	11.5	2.08	13.5	7.38
2+	10.22	0.92	7.6	18.9	1.85	13.2	10.80

Children Under 6							
0	4.91	0.42	7.5	9.2	1.88	13.3	5.31
1	10.25	1.02	6.3	19.8	1.93	15.9	13.93
2+	10.22	1.05	8.1	20.1	1.96	12.3	11.48
Highest Grade							
l.t. 9th	11.93	1.21	6.0	23.0	1.93	16.7	16.78
9th-11th	11.15	0.90	6.1	19.6	1.75	16.4	12.86
12th	4.38	0.30	9.0	7.5	1.71	11.1	3.23
Some College	1.32	0.13	13.0	2.7	2.06	7.7	.99
Earners							
Present	3.50	0.40	10.9	7.7	2.19	9.2	3.54
Not Present	14.37	1.08	4.3	24.0	1.67	23.3	20.07
Elderly[2] or Disabled							
Elderly	5.12	0.43	5.3	9.5	1.86	18.9	7.50
Disabled	24.54	3.22	6.3	47.4	1.93	15.9	33.82
Both	9.08	0.68	5.5	15.7	1.72	18.2	11.00
Neither	4.96	0.49	8.5	10.0	2.01	11.8	5.45
MONTH							
Feb.	5.57	0.68	7.1	12.4	2.23	14.1	8.74
Mar.	5.81	0.70	9.2	12.8	2.21	10.9	7.07
Apr.	5.94	0.72	10.0	13.1	2.21	10.0	6.72
May	5.98	0.31	9.4	9.1	1.53	10.4	3.19
June	5.69	0.52	6.0	10.9	1.92	16.7	7.98
July	5.84	0.30	6.4	8.9	1.52	15.6	4.48
Aug.	5.83	0.52	5.6	11.1	1.90	17.9	8.50
Sept.	5.93	0.55	10.1	11.5	1.93	9.9	5.16
Oct.	5.92	0.56	4.9	11.6	1.95	20.4	10.26
Nov.	6.18	0.66	3.8	12.8	2.07	26.3	14.80
Dec.	6.49	0.26	6.9	9.1	1.41	14.4	3.63

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel. PRELIMINARY RESULTS--NOT TO BE CITED.

Partic. rate = [Total Participant Months]/[Partic. Months + Non-Partic. Months].
Entry = as table III.7.
Exit = as table III.5.
Annual Partic. Rate = derived from entry rate:
$= 1 - (1\text{-partic. rate})(1\text{-entry rate})^{11}$
A/M = Annual Partic. Rate/Partic. Rate
Duration = 1/Exit Rate
SS = Predicted steady-state partic. rate = Entry rate/Entry rate + Exit rate.

TABLE D.12

FOOD STAMP EXIT PROBABILITIES
BY SELECTED UNIT CHARACTERISTICS
(AVERAGE MONTHLY EXIT RATE FOR STARTING COHORT)

TOTAL	6.83%
PA[1] Status	
AFDC Recipient	9.38
Non-recipient	6.38
Other Welfare[1]	
Recipient	7.91
Non-Recipient	6.74
Age of Head	
l.t. 25	8.05
25-44	7.28
45-59	8.14
60-64	5.97
65+	3.62
Family Status	
Married w/children	9.27
Single w/children	5.85
Married, no children	7.77
Single, no children	5.91
Race	
White	6.61
Non-White	7.17
Unit Size	
1	5.65
2	6.16
3-4	9.01
5+	5.91
Children Under 19	
None	6.41
1	6.52
2+	7.31
Children Under 6	
None	6.70
1	7.22
2+	7.07
Highest Grade Completed (head)	
l.t. 9th	4.21
9th-11th	6.03
12th	9.72
Some College	14.57
Presence of Earners	
Present in Unit	8.42
Not Present	5.71
Elderly[2] or Disabled Persons	
Elderly	3.38
Disables	6.05
Both	4.43
Neither	8.67

Source: Calculated by Mathematica Policy Research from 1979 ISDP Panel.

[1]GA and/or Emergency Assistance.

[2]60 or over.

Average monthly exit rate for starting cohort $\quad 1 - \sqrt[11]{(P_{12}/P_{Jan})}$

where P_{Jan} = participants in January 1979.
P_{12} = participants all 12 months of 1979.

APPENDIX E

ISDP ESTIMATES OF FOOD STAMP CASELOAD

Food Stamp Participation--Aggregate Counts

Although the weighted distributions of food stamp households in the ISDP RAMIS II file are unbiased, the levels of participation implied by the weighted counts of sample households who receive food stamps are low in comparison to other sources of information. This is due in part to the absence of an appropriate set of longitudinal weights calibrated to achieve population-representative counts. There is also evidence of underreporting of Food Stamp receipt (Czajka, 1981).

The weighted counts of food stamp households in the ISDP Panel vary over the calendar 1979 period, rising in February, falling in April-May, then rising again in October and finally dropping off in December. This pattern, while not unusual for a "typical" year, does not match the 1979 program data very closely, as seen in table E-1. The Food Stamp Program grew fairly steadily throughout 1979, according to program data. The reasons for this discrepancy may be related to weighting problems, in which case true longitudinal weights available in the future may produce sample results more in tune with program data. It is also interesting to note, although perhaps coincidental, that the unweighted sample counts follow a pattern more similar to that shown in the program data.

When sample attriters and units with substantial income nonresponse are screened out[1] the weighted ISDP counts do not exhibit such an extreme quasi-seasonal pattern. The trend over the 12 months is upward, on balance, although there is still a pronounced mid-year dip.

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[1]As for eligibility analysis; see Appendix A and Appendix B.

Effects of program change. Some of the changes in the Food Stamp Program that were implemented in early 1979 may have had a direct effect on turnover observed during that year. Elimination of the purchase requirement (EPR) attracted large numbers of new participants to the program. The caseload grew by 4.3 million persons during 1979,[1] which would by itself be expected to increase annual-monthly participation ratios for 1979 regardless of how long new participants stayed on the program.

In addition, regulations for certifying public assistance (PA) recipient households for food stamps were changed. Prior to the 1979 Act, PA households were automaticaly eligible for food stamps. In a change phased in during early 1979, these households were subject to the same eligibility tests as non-PA households. By itself, the effect of this change in procedures would be to reduce the number of PA households in the program. At the same time, however, these households are thought to have been among those most influenced in their participation behavior by EPR. By several measures, PA households are a low-turnover subgroup in the food stamp program. If the changes in program rules on balance tended to exclude these households, turnover, as measured by exit rates for example, would be higher than otherwise. If the effect of the program change was to attract more PA households on balance,[2] aggregate program exit rates would be lower, but measures such as annual-monthly participation ratios would be higher in 1979 due to the influx of new households during the year.

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[1] Effects of the 1977 Food Stamp Act: Second Annual Report to Congress, Food and Nutrition Service, USDA. January 1981.

[2] Prior to PL 95-113, public assistance households, although automatically eligible for food stamps, had to use a substantial portion of their monthly PA allotment to meet the purchase requirement. Under the new rules, they received the bonus portion of their allotment directly without any cash outlay.

Table of Contents

TABLE E.2

CHARACTERISTICS OF FOOD STAMP HOUSEHOLDS
(COMPARISON OF ISDP AND FOOD STAMP SURVEY)
(1979)

	ISDP Panel[1]	FNS Survey[2]		ISDP Panel	FNS Survey
AFDC			Unit Size[4]		
Recipient	25.5	34.0	1-2	41.2	53.8
Non-recipient	73.1	66.0	3-4	29.2	31.2
			5+	29.5	15.0
Other Welfare[3]			Children		
Recipient	9.6	6.0	0	38.5	46.0
Non-recipient	89.0	94.0	1+	61.5	54.0
Age of Head			Earners		
1.t. 45	57.0	56.6	Present	44.7	20.3
45-59	19.2	14.6	Not Present	53.9	79.7
Race			Elderly[5]		
White	61.3	56.8	Present	27.4	24.2
Nonwhite	38.7	43.2	Not Present	72.6	75.8
			Disabled		
			Present	22.0	14.1
			Not Present	78.0	85.9

[1]Calculated by Mathematica Policy Research from 1979 ISDP Panel.

[2]Characteristics of Food Stamp Households: November 1979, Food and Nutrition Service, Office of Policy, Planning and Evaluation. June 1981.

[3]General Assistance; ISDP may also include Emergency Assistance.

[4]"Under 19" for ISDP; "dependent children" for FNS survey.

[5]Over 60.

to the characteristics survey--given that these definitions are not precisely equivalent, the proportions seem fairly close.

The proportion of households with earnings is substantially higher in the ISDP file (45%) than in FNS' characteristics report (20.3%). The variable used in the turnover analysis indicates the presence in a household of any person with earnings in a given month, which is equivalent to a household measure of earnings receipt. The characteristics survey identifies households with earnings based on reported sources of income. It is not clear why the ISDP data have a much-higher proportion of earners among food stamp households. However, it is often the case that survey data produce higher estimates of the incidence of earnings than do program data.

The proportions of food stamp households with elderly members are similar on the ISDP data base (27%) and in the characteristics survey (24%). The ISDP identifies a substantially higher proportion as disabled, however--22% compared to 14% in the characteristics survey. This is likely to be due in part to differences in the definitions of disability used. The ISDP variable used identifies individuals as disabled if they indicated in response to a question in the Wave I interview, that they were "limited in the amount or kind of work" they could do, due to disability. In the FNS survey, individuals who are exempt from work registration requirements due to disability are identified.[1]

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[1]Survey response on disability questions is generally troublesome due to the subjective nature of the question. The Food Stamp Program data presumably reflect a more objective (and perhaps more restrictive) assessment of disability.

Table E-2 has been confined to distributions of characteristics that can be compared directly with the food stamp survey data. An expanded table based on the ISDP data alone is included with the supplemental tables in Appendix D.